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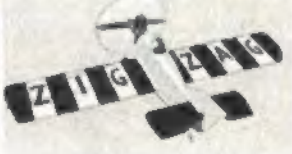

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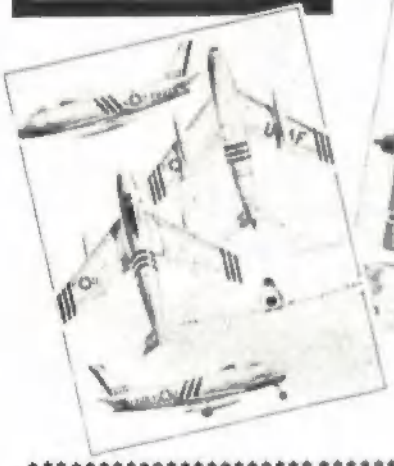

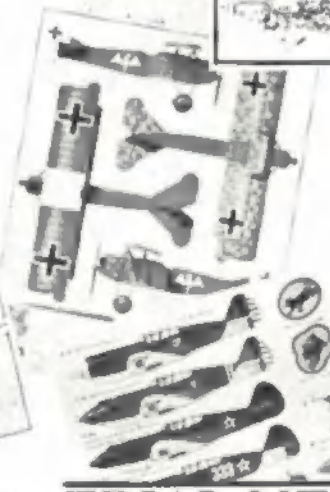

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STRAIGHT...  ...AND LEVEL

An editorial reprint from June '69: still awaiting serious investigation on Whitehead accomplishments.

GUSTAVE Whitehead, forgotten man of aviation, died a pauper in Fairfield, Conn. on October 10, 1927. Discredited and ridiculed for more than six decades Whitehead has been as effectively isolated from his place in history as the fictional "man in the iron mask" had been barred from the kingship of France.

Whitehead's crime was that he might have been the true father of flight. Evidence that he had flown on August 14, 1901, more than two years before the Wrights — and he might have flown before then — was so strangely intolerable that, to this day, this demonstrated genius has been deprived of fair trial by eminent authorities. Actually, no one among the growing list of Whitehead supporters would detract from the Wright Brothers' great achievements. They merely want Whitehead claims accorded objective investigation. He was at least an authentic pioneer.

In the April 1, 1902 issue of the *American Inventor*, appeared a three-page article by Whitehead about his No. 22 airplane. Powered by a compression-ignition kerosene-fueled five-cylinder engine, it had been built in four months with the aid of 14 mechanics at a cost of $1,700. Similar, except for acetylene gas fuel, No. 21 — described in the November 1968 American Aircraft Modeler — reputedly made the first flight (over a half-mile claimed) at Fairfield, Conn., on August 14, 1901. In the *American Inventor*, Whitehead described several flights by No. 22, including one of almost seven miles duration, and another of 200-foot altitude during which full circling flight was achieved by steering and variable control of twin propellers. Water landings were made on its boat-like fuselage.

Interesting features included folding wings and tail, front wheels drivable by the engine, and rear wheels steerable, while on the ground. A pendulum device — widely used successfully years later on free-flight models in England — was intended, like an automatic pilot, to help maintain equilibrium. Concluding a matter-of-fact article — impressive to the present-day reader — Whitehead commented, "To describe the feeling of flying is almost impossible for, in fact, a man is more frightened than anything else." And, " . . . I do not care much in being advertised except in a good paper like yours. Such accounts may help others who are working along the same line."

What did bring Whitehead disastrously to public attention was a full-page article in the August 18, 1901 issue of the *Bridgeport Sunday Herald*. The editor stated that Whitehead was the first to solve the riddle of flight, and included the inventor's description of the flight. This claim plagued historians — and Orville Wright who stated ". . . design . . . is . . . enough to refute statements the machine flew." The Herald story was ignored, but articles about Whitehead's powered flights were carried in leading aeronautical magazines and journals. Recent tunnel and model tests prove #21 fully flight capable.

Eye-witnesses of Whitehead flights exist. Some have been interviewed, others ignored. Some, never questioned by indifferent authorities, have died. By far, the strangest story, concerns one, Louis Davarich, who had been associated with Whitehead in Pittsburgh *before* Whitehead moved to Connecticut. Interviewed by Stella Randolph in the 1930's, Davarich recalled how he *and* Whitehead flew an aircraft into a building, exploding the boiler of its steam engine. The statement was verified by Mrs. Whitehead. A present-day member of the Fairfield Police Department, and nephew of Mrs. Whitehead, saw the scars, which Davarich explained to him. Davarich is dead.

The late Gustave Whitehead stood with his lightweight two-cylinder air-cooled engine of 1902-3 at Blackman's Studio at 148 Fairfield Ave., Bridgeport, Conn. His easy stance contradicts opinions that his engines were heavy. By his side is the bicycle wheel, with blades inserted, which had been used while conducting early-type wind-tunnel tests in his Pine Street shop (which the Wrights visited in 1903). This again contradicts former views that he had not conducted extensive airfoil experiments in shop experiments.

Photo Courtesy, G. Whitehead family. © 1968 Stella Randolph.

In 1965, Lt. Col. Bob DeiBuno, of the 9315th Air Force Reserve Squadron, interviewed Mrs. Davarich in Miami. The transcript shows she sat in the Pittsburgh aircraft which made a short hop. If true, she would have been the first powered-aircraft passenger.

Also interviewed by the Stoneham Papers in the mid-thirties, Mrs. Davarich, has again been located, thanks to a letter from her son to Major O'Dwyer (author of our November article) via a subsequent Randolph article in

Continued on page 68


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A scholar in the house?

I would like to ask for your help in affording me information on building, testing or research of any kind on the miniaturization of gas turbine engines. I am an aviation engineer and a long-time model builder with unfortunately little time to enjoy the latter.

I have been doing some research into small gas turbine engines, but the sources of information are quite limited. My job as an engineer involves the manufacturing of major components for turbine engines which puts me in a good position for researching the possibilities of a "model" gas turbine engine.

I would greatly appreciate any information you or your readers might have, or any source you can refer me to.

Thomas Zaloga, 2232 Crowley St., Muskegon, Mich.

We have included Mr. Zaloga's complete address so that readers can reach him.
— The Publisher

The good times we had . . .

I wrote a letter to your magazine last November or December, I cannot recall the exact time. This is not important; the most important and surprising thing was the outcome of it all. Here is a rundown on the effect your story had for me and, I dearly hope, for those it served.

In reading your Straight and Level column, I noted that a chap wanted some Joe Ott plans. It so happened that I came into quite a lot of these several months ago from an old sport shop dealer who had quit selling models years ago. He couldn't sell the kits at that time and, instead of selling them wholesale, he stashed them in his storeroom. I purchased them for a lump price. I came struggling in with box after box of dusty old plane kits; I just couldn't resist. Joe Ott had a whale of a good idea going for him, but the World War killed it for him when they glommed all the balsa!

I thank you with all my heart and want you to know that your editorial sold every solitary one of those kits to over 200 writers, whom I wrote to individually. I never dreamed it would have the impact that resulted from it all.

I never received my copy of AAM in the mail until the kits were nearly all sold out. All of a sudden, I'm getting letters inquiring as to the prices of my Ott kits. I received about a dozen letters before it dawned on me what you folks had done! I am only sorry I wasn't in the position to serve every modeler who wanted Joe Ott kits. I guess Cleveland still does operate a plan service — boy, if he and Ott and Megow could only come back in the ball park and hobble up to bat one more time! I think they could open the old tomb up again.

Every letter I received just leans in that direction: prices are the real thing that guarantee success — you only need your back yard and a buck to build a little old scale job of a Waco or Laird Solution!

Ralph Fries, Mendon, Mich.

One 'Q' ran

I read with much interest your article on the GHQ engine.

Did any of them run? I know of at least one that did, but can't remember whether it did before some modifications were made — building up the baffle on the piston, chrome plating and lapping same for better compression. The car and engine were built about 1939 and even won a first place in its class; most of the competition were Dennymite-powered. The speed was something over 35 mph. These races were run in a garage on a not-too-smooth concrete floor. The hot motor at that time was the Super Cyclone, running around 50 mph.

The GHQ would run in either direction as the fuel induction was through the side of the cylinder, under the exhaust, and spark timing would determine which way it ran. In the car that presented no problem, but with a prop it could kick back and take off the wrong way. I believe very few ever ran in any direction.

In case you are interested in details of the car, it had a cast aluminum frame and radiator shell, 14-gauge hammered-out sheet aluminum body and pan, spring bronze leaf springs, tube front axle with steerable spindles and the tierod, drag link and radius rods made from carburetor ball and socket joints. The grille was brazed up from 1/16 welding rod and chrome plated. Paint was white with maroon front and numbers, and the car weighed about 7 pounds.

I was an auto mechanic at the time I built it and made all parts myself, including patterns. It was the first of several and, except for World War II service, I raced them until 1953. I still have three cars; would never part with any of them.

Elton M. Winchell, Detroit, Mich.

Vanishing catalogues

May I take just a little of your time to say thank you for putting out the "most" of magazines. I, along with many others, appreciate your efforts in publishing AAM.

I do have one complaint, a gnawing irritation, that I would like to have published in "You Said It" and maybe we (your public) could get some satisfaction. It has to do with several of your advertisers. Better than a month ago, I wrote to several different full-, and quarter-page advertisers who say, "Send 50 or 25 cents for our catalog."

I am disgusted with the poorest service I have ever seen and have made several phone calls to get results. The standard answer is, "I'm sorry to hear that. We've been caught up with our mail for weeks now."

Now, Mr. Advertiser: Who, I mean WHO, is getting your 50 or 25 cents? It is not me.

Faithful reader

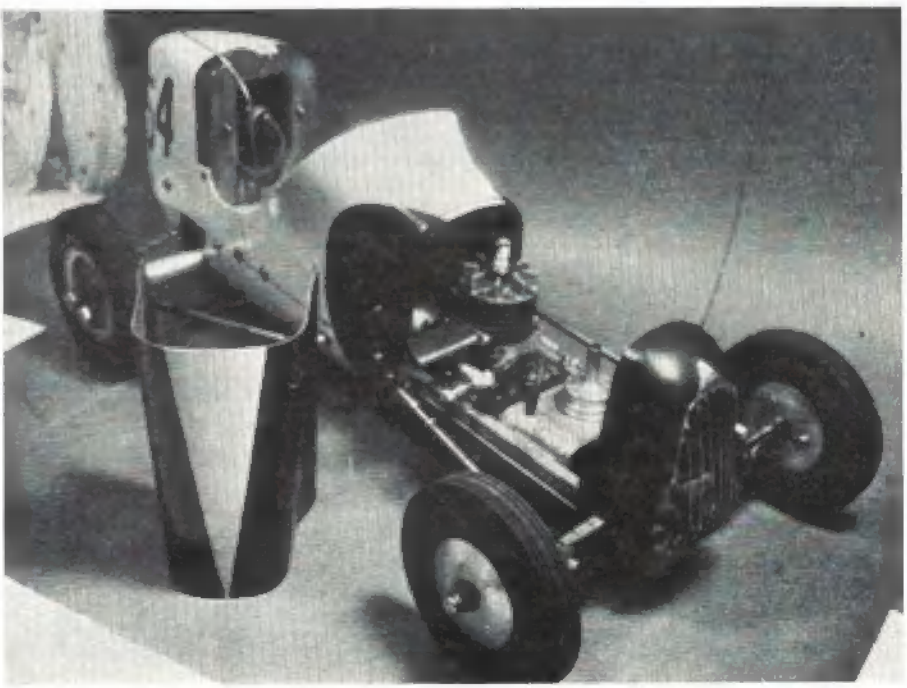
The writer's name has been withheld at his request. He is associated with the trade — a firm, in fact, which mails catalogues instantly. Or so he says.
— The Publisher

Glides like a rock

I am 13 and have been in this hobby since I was six. I finally saved up enough money after graduating from FF a few months ago, and got my new Testors Simpulse I last month. I quickly installed it in my red and black Jr. Falcon and was ready for flying the next day.

Unfortunately, there were 25 mph winds and it drizzled all day. The next day, though, was fine — no wind at all. Since my model was tail heavy, I had to add 10 oz. up front. The model glided like a rock with wings, but I decided to fly it anyway.

After two unsuccessful attempts at hand launchings (the field was covered with gopher holes, and was too bumpy for ROG's), it finally flew. It was really going slow, I



Charlie just won the big one at Indianapolis.

That makes three weekends in a row for Charlie. At this rate, it won't be long until he'll be taking on the terror of Elm Street, "Flash" Ferguson.

Asked in the Winner's Circle about the secret of his coveted driving style, Charlie—with the roar of the .19 cu. in. engines still in his ears and the feel of the road still in his hands—just smiled, lifted his goggles, and said it in one word.

"Cobra."

"Cobra?" — you could hear the crowd buzzing to itself. "What's a Cobra?"

If they only knew. Cobra is Orbit Electronics' new radio control system — the first to be designed exclusively for race cars. Charlie didn't have to buy a 3-channel or 4-channel "hand-me-down" stick system made originally for aircraft guidance.

Instead, his Cobra offers unique features vital only to car handling: cam-action steering, strip-resistant servo gears, changeable crystals, and detented gear shift control. Just to name a few.

For free detailed literature and the name of your local Cobra dealer, write today: Orbit Electronics, Inc. / A Datatron Company / 11601 Anabel Avenue / Garden Grove, California 92640.

Then watch out for Charlie!

guess, because of the weight, and somehow couldn't gain more than ten feet altitude.

Then it started to veer toward the trees. I gave it just a little tiny nudge on the stick and boy (!!) it went into a 60-degree bank. By correcting it, I was barely able to level it and bring it in for a bouncy landing. I couldn't understand it: I'd done just like it said in the books and the clevis was in the outer hole of my control horn.

The second flight was much less hectic. I was much easier on the control stick and the plane flew beautifully. In fact, I had given it too much up elevator and unwittingly I did a Hammerhead Stall!

I decided to call it a day then, and gave it one last enthusiastic hand launch. The plane stalled and landed right smack on a concrete curb. Oh, well. . . .

I have the plane fixed up now and it is ready to fly again.

I really like AAM, and I think it's fun to hear about other modelers' misfortunes.

Richard J. Kehoe, Frankfurt, Germany

Never too late

Enclosed are snapshots of my first attempt at radio control models. My last flying model was made in 1939 — one of the ole rubber models. I got the urge at the World War I model meet in Rhinebeck. I enjoyed it and saw so many men of my age having a ball and meeting fellow modelers, it restored my faith in hobbyists.

I read your article on "doing your thing," as the kids say it. I tried to find a good scale E III plans, but to no avail. So I drew my

own plans, two inches to the foot. Not knowing a thing about radio control do's and don't's, I really had nightmares. I then met a fellow modeler who gave me some hints and advice on construction.

Now I'm building a trainer so I can learn to fly and can't wait to see it go aloft and see it in flight!

I read your article on the GHQ. Most of my models were built from their kits. I've seen the engines being made and I can swear that I only heard one make any noise. I've seen many on test benches.

I'm looking forward to being on the field with other modelers — enjoying our second childhood. I enjoy AAM's articles and your magazine getting some of the youngsters into the hobby, and enjoy doing my "thing."

Ernst F. Mausoff, Ermond, R. I.

A plan from yesteryear

In a recent issue of AAM, there was some reference to Joe Ott and Ott plans. This struck a responsive chord and I decided to look into the matter. As Joe Ott lives only about two blocks from me, it was no problem to get in touch with him. A fast search on his part turned up the "Vultee Vanguard" plan. To my knowledge these were the only plans printed in this style. This kit, incidentally, sold for 50 cents through Kresge, Woolworth, etc.

I don't know if the print will stand reduction and reproduction, but it might be of

Continued on page 72

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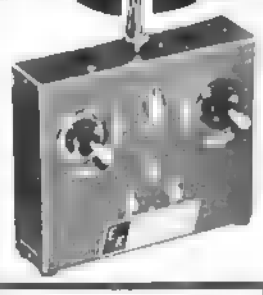

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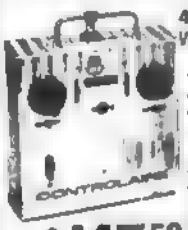

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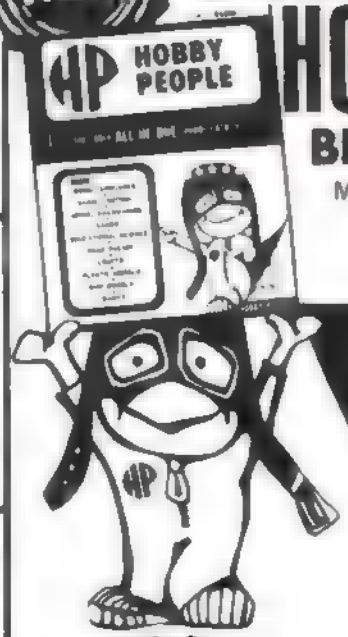

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ON THE SCENE

The George Aldrich Workshop

Visit to an engine expert's quarters reveals how engines are prepared for racing performance and long life.

BY IRVING

COURTESY AEROMODELLER

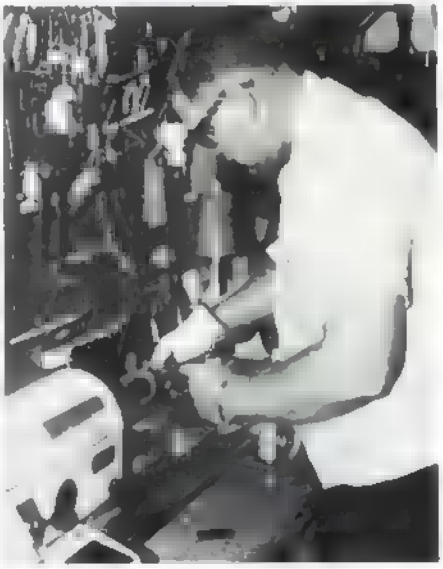
Photos by the author

With electronic strobe tachometer behind him, George prepares an O.P.S. 60 for test.

MORE and more specialization in the many facets of modeling, together with greatly increased sophistication of models, has meant that in the competitive branches of the sport, those modelers who wish to win contests consistently must develop every aspect of their models and contest techniques as near to the ultimate as possible. There can be little doubt that this requires considerable dedication of effort and time, but certainly this is the only way for any aspiring modeler to succeed.

Attention to the minutest detail is also one

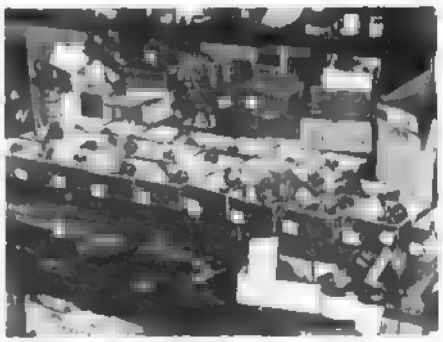
Continued on page



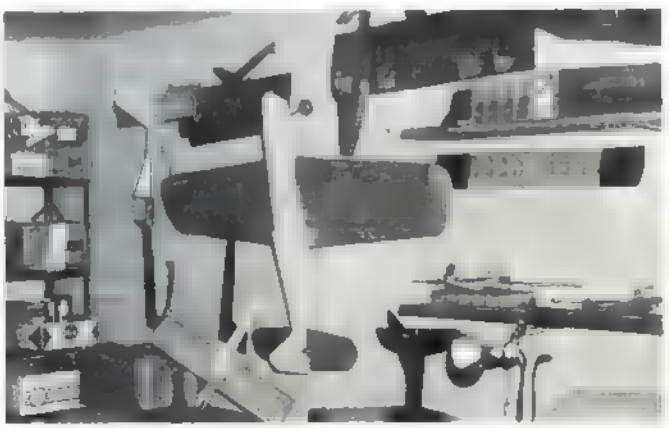
Besides George, heart of his shop is the fine Rockwell milling equipment. Honing a sleeve.

Under development, a tuned pipe CL speed ship. Flies clockwise with engine angled in.

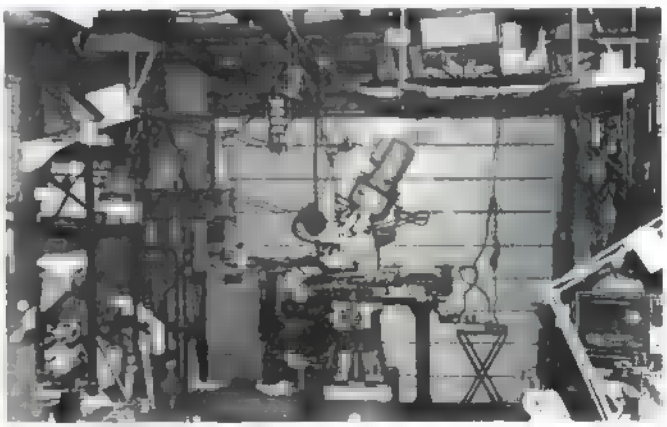
Projects everywhere! Some planes are engine-testers, others are new Aldrich designs.



Right: Names on boxes tell which experts use Aldrich-prepared engines. All FF 15's.



Removable-wing CL stunter at left and RC Nobler, originally designed by George for CL Stunt, and even a rubber (what?) FF job.



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World's FIRST Single or Twin Engine R/C Models

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For Twin Eng. Use Two .09's or .15's

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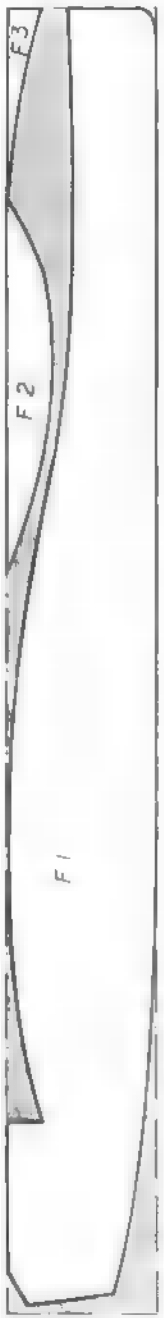
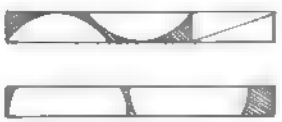


LAYOUT OF FUSELAGE PIECES FULL SIZE



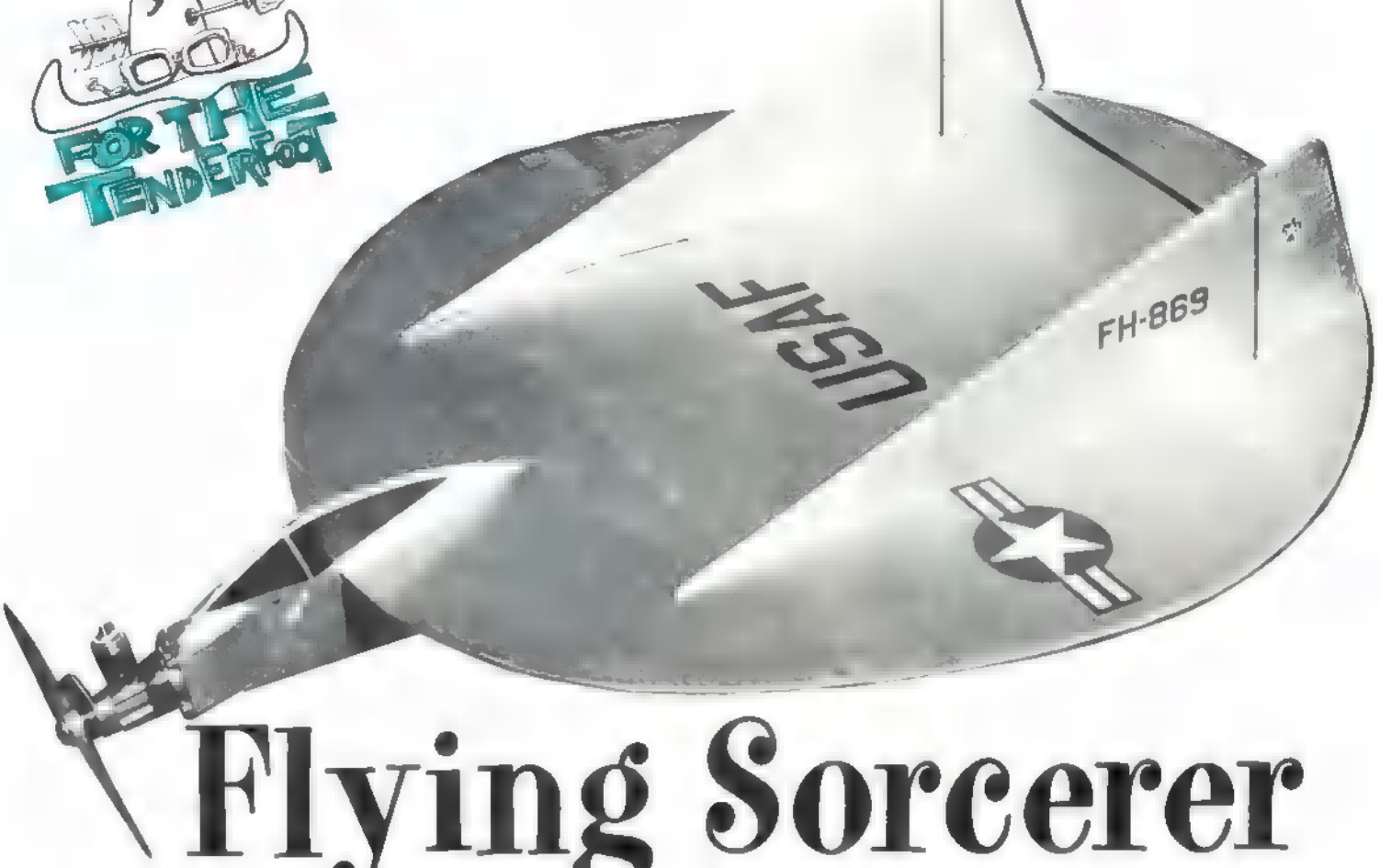
LAYOUT FOR WING PIECES (NOT TO SCALE)

FLYING SORCERER

DESIGNED & DRAWN BY

FULL SIZE PLANS AVAILABLE — SEE PAGE 70

FOR THE TENDERFOOT



Flying Sorcerer

Do you believe in flying saucers? Now you can—this one's for real, an 020 free flight.

JACK HEADLEY **PHOTOS BY THE AUTHOR**

AFTER some years of study, the Air Force apparently has decided that flying saucers really don't exist. Perhaps they should have paid more attention to Southern California before making up their minds, because flying saucers have been seen there for quite a while. Of course, these saucers are not too big and don't fly too long, so possibly the Air Force can be excused.

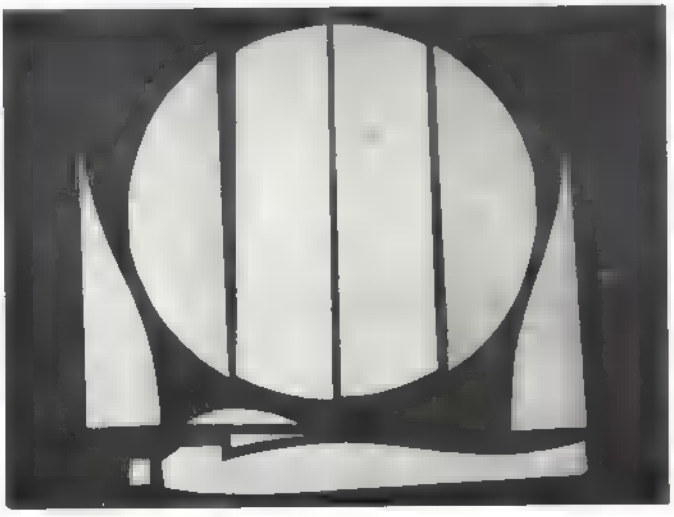
These UFO's are in reality models, the latest version being the Flying Sorcerer. Earlier models were powered by various-sized engines, including a Jetex-powered version. Then there was the model known as the Flying Pizza because of its unfortunate color scheme composed mainly of yellow and red!

Construction

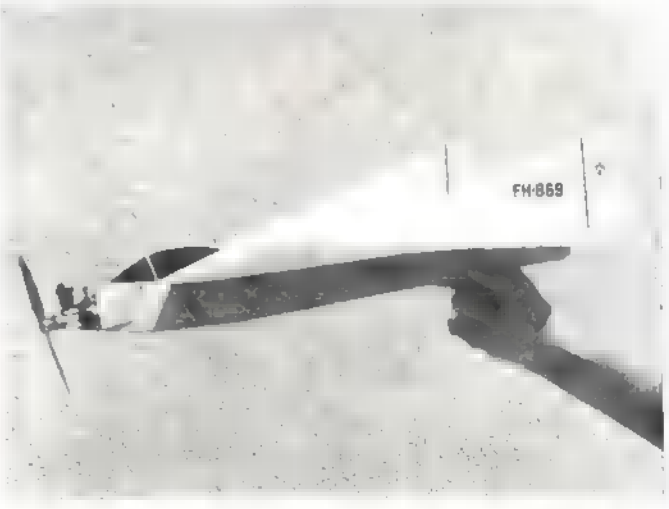
Before beginning construction, it is especially important to study how the various pieces are cut from sheet wood. The following materials are needed: 2 pieces of 1/32 x 4 x 36" balsa; 1 piece 1/4 x 2 x 18" balsa; 1 piece 1/8 x 1 x 1" plywood; 1 piece 1 x 2" gauze; and 4 No. 2 x 3/8" wood screws.

Take the two sheets of 1/32" balsa and select the harder. This is the sheet to use for the front and back pieces of the wing and for the fins. To get the shapes correct, put the wood under the plans and, with a pin, prick through the outline of the shape onto the wood. Next, using a ballpoint pen, join

Continued on page 74



When assembling the few parts involved, fuselage and rudders hold wing's curved airfoil. Use lots of glue and pins at these joints.



Simple markings made with paint, decals, and marking pens turn it into a USAF-type plane. Model must be painted for fuel protection.

The Air Force Museum

It was impossible to get all of the B-36 in picture frame! Six huge multi-row, "corn cob" radial air-cooled engines, plus four jets, powered the beast. It never fired a weapon or dropped a bomb in anger. Small jet in pix was carried internally as experiment.

One of the world's standout collections of historic aircraft is a scale modeler's bonanza.

WILLIAM F. GROMAN JR.

Photos by the author

GOOD scale material, which can be presented in a contest with no doubt of its validity, is worth its weight in gold. Unfortunately, such material does not appear to exist for many classic aircraft. Thus, we see an endless repetition of models for which scale material is easily obtained, and a noticeable absence of models for which it is not.

There is a solution, though, and it is a great deal simpler than most modelers would suspect. All it involves is mailing a stamped, self-addressed envelope to the Air Force Museum at Dayton, Ohio. If the aircraft the modeler inquires about is there, he may borrow materials from the Museum's files without charge. The Museum is willing to aid in any serious research.

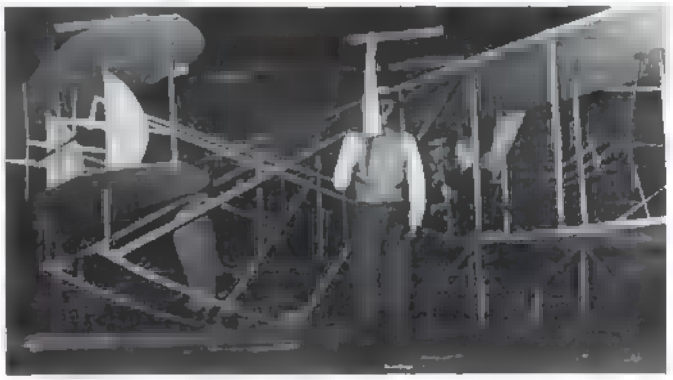
The modeler fortunate enough to visit the Museum will find numerous aircraft on static display — all in good condition and nearly all complete, in contrast to some other air museums. The Museum is arranged and maintained with orderly regard for the place the airplane holds in history.

The main building, larger than most museums in their entirety, is accompanied by a lot equally as large which accommodates additional aircraft, which cannot be housed. In front of the building stands an Atlas ICBM, beside an A-1 E Skyraider painted for Viet Nam duty. Flying the Skyraider, Major Bernard Fisher won the Medal of Honor. The modeler will appreciate the fact that historic craft have been selected for display, but with a most careful eye to their value as a part of the history of airplane development as a whole.

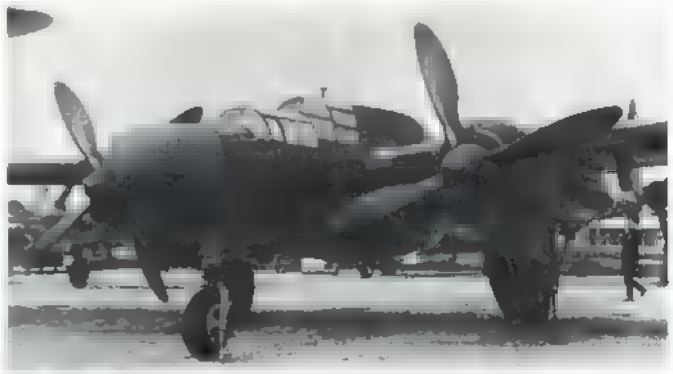
Admission to the Museum is free, and it is open every day of the year except Christmas. It is maintained by contributions and by profits from the souvenir shop in the lobby. Earphones may be obtained, at a small cost, for recorded information at the individual displays. A receptionist in the lobby will assist the scale modeler by making available the files on a specific plane.

The first section of the Museum, devoted to the dawn of flight, contains a small replica of the Montgolfier balloon, copies of Leonardo da Vinci's drawings, and other mementos of pre-twen-

Continued on page 83

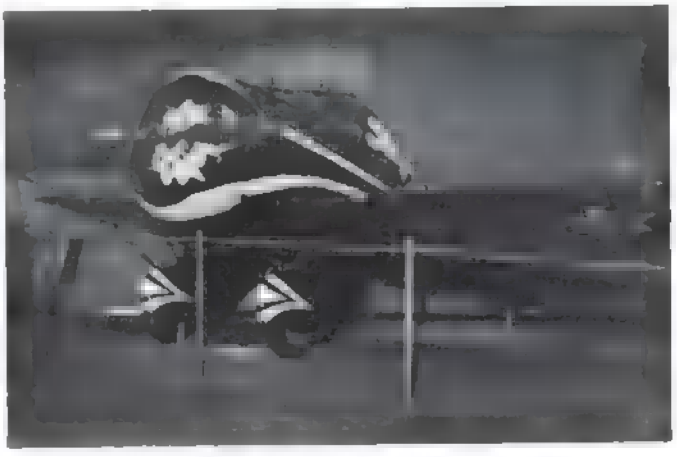


Wright Military Flyer of 1909 (used until 1934!) has ailerons instead of wing warping. Figures are the Wrights and Army personnel.



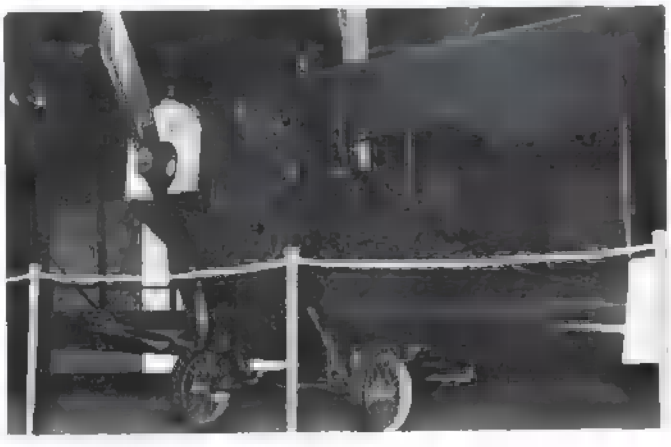
Northrop P-61 "Black Widow." Night fighter carried tremendous fire-power, was very fast. Also used for photo reconnaisance.

The only Curtiss P6E Hawk left. Museum has whole lineup of trainers in fascinating blue, yellow, and striped tail colors.

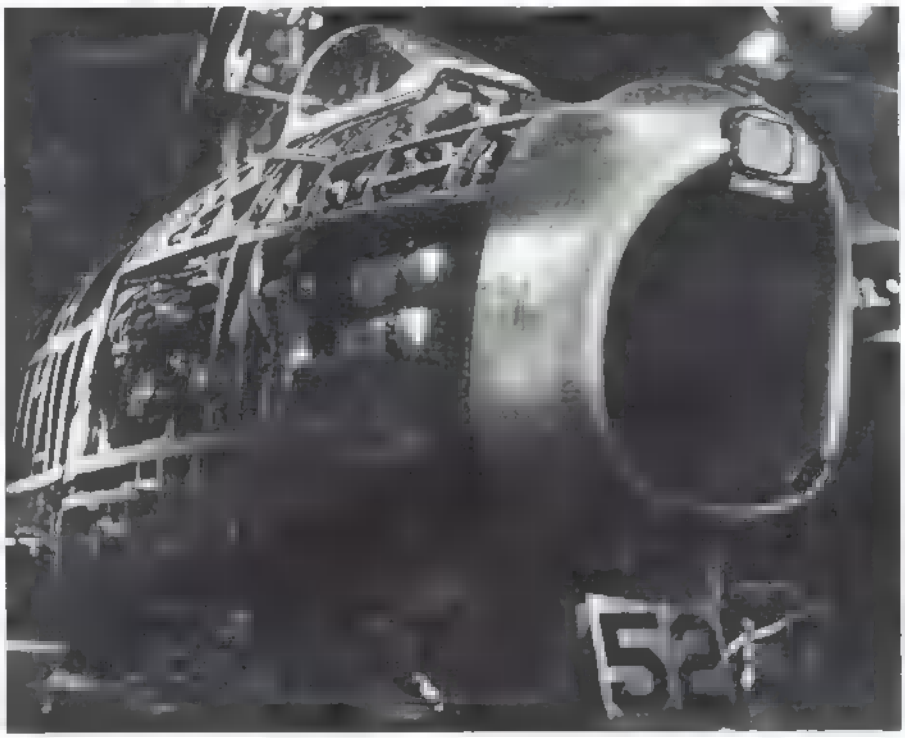


Beautiful Boeing P-26A is on loan from Smithsonian. Obtained from Guatemala in 1939. Served in Canal Zone through 1942.

Every air museum must have at least one Jenny. Surprisingly big, the JN-4D got only 90 cantankerous horses from its Curtiss OX-5.

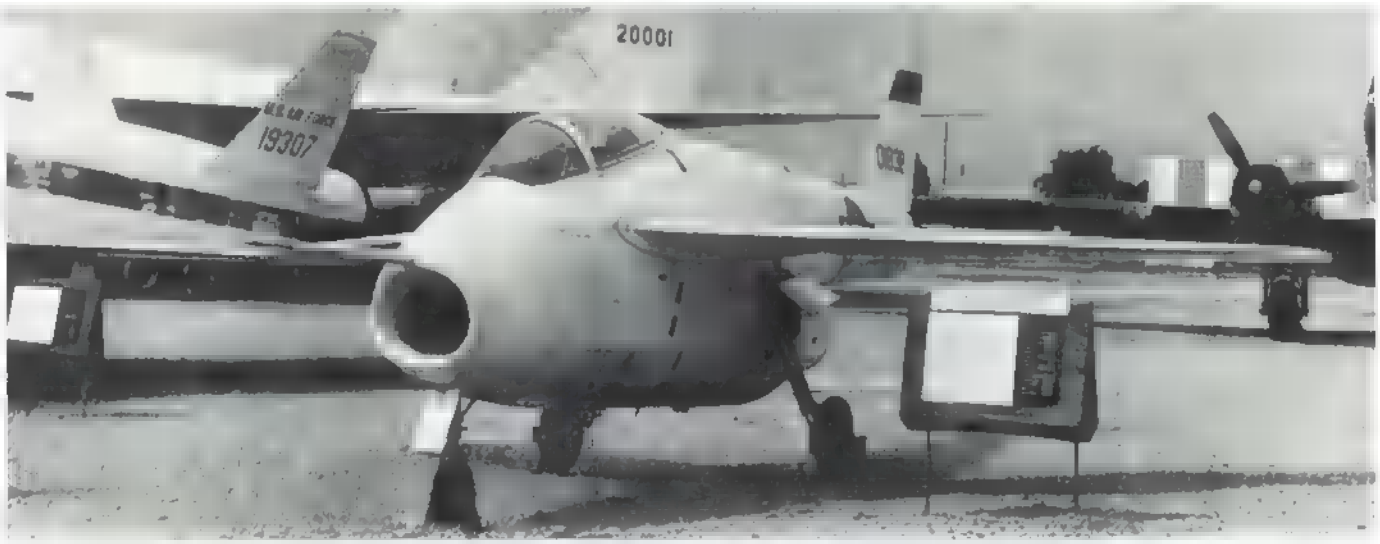


The rare "Twin Mustang" by North American. Not a mating of two Mustangs, F-82 is fully-engineered twin fighter. Only one pilot.

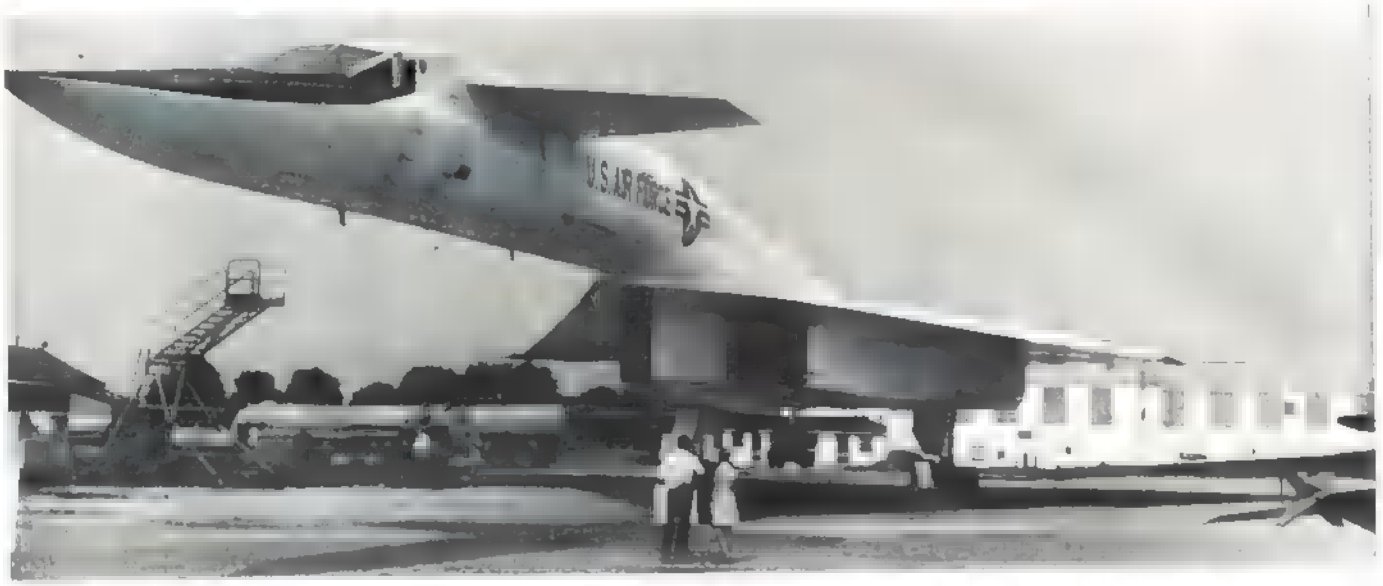


To give some idea of the complexity of modern jet fighters, several fairly new engines are shown. This skinned F-86 illustrates how many other sub-systems and components are involved. Known as the Sabrejet, it may have flown 20 years ago; some still fly actively.

Swing wingers are not new; the Bell X-5 was built 20 years ago. This is the remaining one; the other plane crashed in '53. Almost the complete line of X-aircraft are now on display. Notice the C-47, recognizable by just its distinctive wing, motor, and gear.

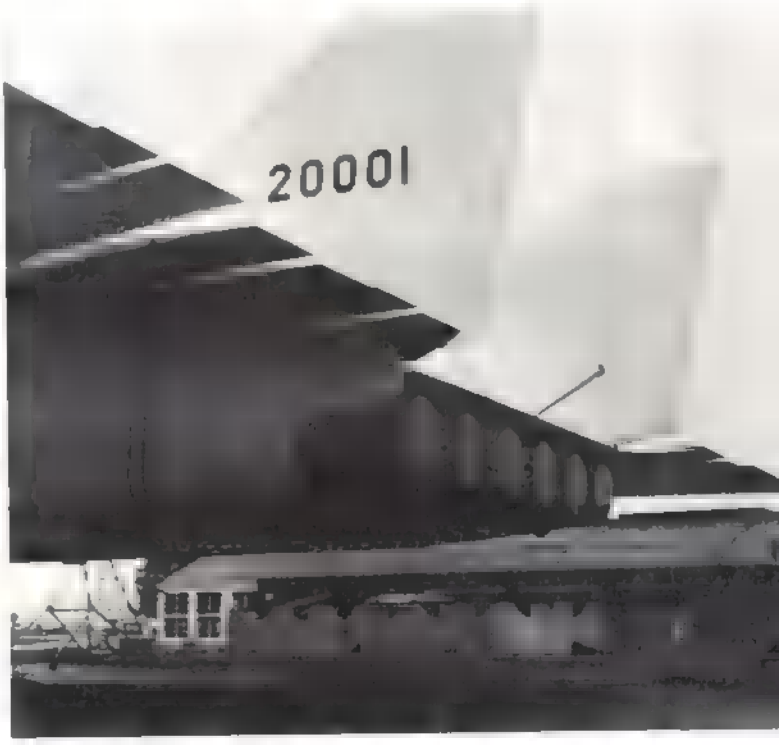


In the foreground is the fabulous F-107. A real hot rod, not many were made. Behind it is a F-102 delta-winged fighter. When museum expansion plans are completed, most of these aircraft will go indoors. Meanwhile, they are carefully stored outside.



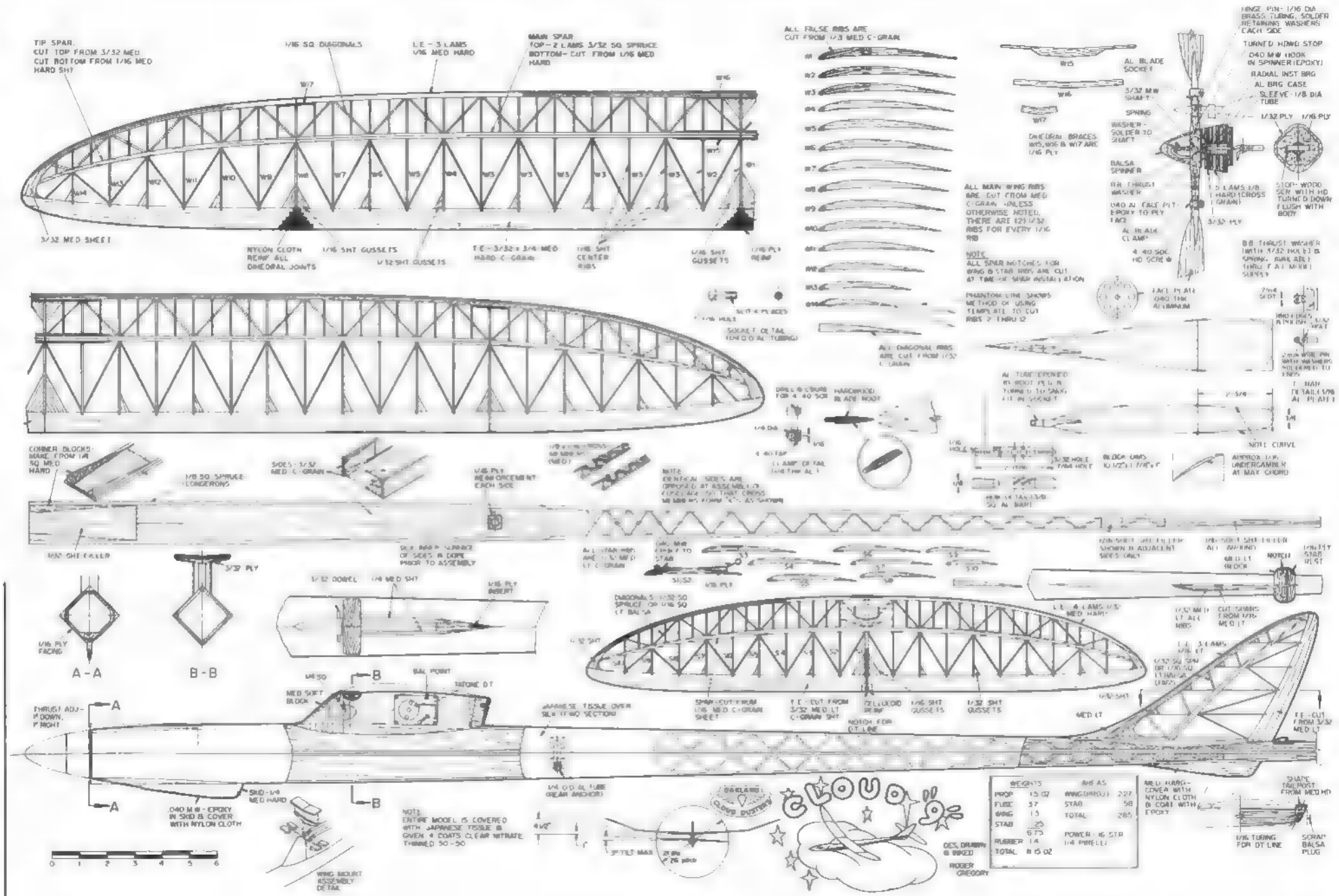
North American XB-70 was intended as a SAC bomber, but turned out to be a basic research project for an American SST which still is being designed. This is the first Valkyrie; the other crashed in a tragic accident. It flew over 2000 mph, Mach 3.

Vertical takeoff and landing is desirable in a fighter, if practical. Ryan X-13 Vertijet tested one idea. Two were built.



Business end of the XB-70, wherein six 30,000-pound thrust YJ-93 turbine engines do their thing. Multi-segment control surfaces used.

Martin's B-57 is U.S. version of the English Canberra. A fine design, it is still used for night photo reconnaisance and day combat mapping. Looks simple, would be a fine model.


TIP SPAR.
CUT TOP FROM 3/32 MED
CUT BOTTOM FROM 1/16 MED
HARD SHT
1/16 SQ DIAGONALS
L.E. - 3 LAMS
1/16 MED HARD
MAIN SPAR
TOP - 2 LAMS 3/32 SQ SPRUCE
BOTTOM - CUT FROM 1/16 MED
HARD
3/32 MED SHEET
NYLON CLOTH
REINF ALL
DIHEDRAL JOINTS
1/16 SHT GUSSETS
1/32 SHT GUSSETS
T.E. - 3/32 x 3/4 MED
HARD C-GRAIN
1/16 SHT
CENTER
RIBS
1/16 SHT
GUSSETS
1/16 PLY
REINF
ALL FALSE RIBS ARE
CUT FROM 1/32 MED C-GRAIN
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
W13
W14
W15
W16
W17
AL BLADE
SOCKET
3/32 MW
SHAFT
SPRING
WASHER -
SOLDER TO
SHAFT
DIHEDRAL BRACES
W15, W16 & W17 ARE
1/16 PLY
BALSA
SPINNER
RR THRUST
WASHER
.040 AL CAST PIT-
EPOXY TO PLY
FACE
AL BRASS
CLAMP
4-40 SOC
HD SCREW
HINGE PIN - 1/16 DIA
BRASS TUBING, SOLDER
RETAINING WASHERS
EACH SIDE
TURNED HDWD STOP
.040 MW HOOK
IN SPINNER (EPOXY)
RADIAL INST BRG
AL BRG CASE
SLEEVE - 1/8 DIA
TUBE
1/32 PLY
1/16 PLY
1.5 LAMS 1/8
HARD CROSS
GRAIN
3/32 PLY
STOP - WOOD
SEW WITH HD
TURNED DOWN
FLUSH WITH
BODY
ALL MAIN WING RIBS
ARE CUT FROM MED
C-GRAIN UNLESS
OTHERWISE NOTED.
THERE ARE (2) 1/32
RIBS FOR EVERY 1/16
RIB
NOTE
ALL SPAR NOTCHES FOR
WING & STAB RIBS ARE CUT
AT TIME OF SPAR INSTALLATION
PHANTOM LINE SHOWS
METHOD OF USING
TEMPLATE TO CUT
RIBS 2 THRU 12
SOCKET OR TAIL
(ENDS OF AL TUBING)
ALL DIAGONAL RIBS
ARE CUT FROM 1/32
C-GRAIN
FACE PLATE
.040 THK
ALUMINUM
BB THRUST WASHER
(WITH 3/32 HOLE) &
SPRING, INSTALL
THRU FACE PLATE
SLOT
WIRE PIN
WITH WASHERS
SOLDERED TO
ENDS
AL TUBE EPOXIED
IN ROOT RIB &
TURNED TO SNUG
FIT IN SOCKET
MAIN
DETAIL 1/16
AL PLATE
NOTE CURVE
CORNER BLOCKS -
MAKE FROM 1/4
SQ MED
HARD
1/8 SQ SPRUCE
LONGERONS
SIDES - 3/32
MED C-GRAIN
1/16 PLY
REINFORCEMENT
EACH SIDE
NOTE
CROSS BRACES ARE
CEMENTED AT ASSEMBLY
AND ARE NOT THAT CROSS
WE SEE IN FRONT VIEW - AS SHOWN
1/16 SHT FILLER
SIDE AND SURFACE
OF SIDES W DOPE
PRIOR TO ASSEMBLY
3/32 PLY
1/16 PLY
FACING
A-A
B-B
3/32 DOWEL
1/16 MED SHT
1/16 PLY
INSERT
ALL STAB RIBS
ARE 1/32 MED
LT C-GRAIN
DIAGONALS 1/32 SQ
SPRUCE OR 1/16 SQ
LT BALSA
1/32 SHT
1/16 PLY
STAB RIB
SPACING
1/16 SHT FILLER
SHOWN IN ADJACENT
BAYS ONLY
1/16 SHT FILLER
ALL AROUND
NOTCH
1/16 SHT
STAB REINF
L.E. 4 LAMS 1/32
MED HARD
1/32 MW
LT ALL
RIBS
CUT SWANS
FROM 1/16
MED LT
L.E. 3 LAMS
1/16 LT
1/32 SQ SPR
OR 1/16 SQ
LT BALSA
(TRIM)
THRUST ADJ -
4° DOWN,
4° RIGHT
MED SHT
BLOCK
BAL POINT
STONE DT
JAPANESE TISSUE OVER
SIDE (TWO SECTION)
SPAR - CUT FROM
1/16 MED C-GRAIN
SHEET
T.E. - CUT FROM
3/32 MED LT
C-GRAIN SHT
CELLULOID
REINF
NOTCH FOR
DT LINE
1/16 SHT
GUSSETS
1/32 SHT
GUSSETS
1/16 SHT
MED LT
T.E. - CUT
FROM 3/32
MED LT
SKID - 1/8
MED HARD
.040 MW - EPOXY
IN SKID & COVER
WITH NYLON CLOTH
1/4 OD AL TUBE
(GEAR ANCHOR)
NOTE:
ENTIRE MODEL IS COVERED
WITH JAPANESE TISSUE &
GIVEN 4 COATS CLEAR NITRATE
THINNED 50-50
4 1/2"
1.1"
3° TILT MAX
WING MOUNT
ASSEMBLY
DETAIL
0 1 2 3 4 5 6
OAKLAND
CLOUD BUSTERS
CLOUD 9
DES, DRAWN
& BUILT
ROGER
GREGORY
WEIGHTS
PROP 15 0Z
FUSE 37
WING 13
STAB 25
673
RUBBER 14
TOTAL 8 15 0Z
AREAS
WING (IMPROV.) 227
STAB 58
TOTAL 285
POWER - 16 STR
1/4 PIRELLI
MED HARD -
COVER WITH
NYLON CLOTH
& COAT WITH
EPOXY
SHAPE
TAILPOST
FROM MED HD
1/16 TUBING
FOR DT LINE
SCRAP
BALSA
PLUG

Photos by Bob Meuser

CLOUD 9

Highly-developed, contest-going Wakefield model is a steady winner.

ROGER GREGORY

THE FAI Wakefield event is, I believe, the most challenging and enjoyable event in free flight competition. The ultimate goal in this international competition is the Wakefield Cup, the oldest and the most coveted award given for a competitive model airplane event. The FAI free flight events have been the subject of more progressive thinking and applied aerodynamic theory by top model designers than any other field of free flight model aviation. Wakefield is no exception!

For those who plan to embark on the long, bumpy road to success in FAI Wakefield competition, it is never too soon to start laying the groundwork. To meet the keen competition, it is best to start the next qualifying season with at least two well-tested models, plenty of good rubber, and lots of determination. Whether the FAI program is your bag, or if you plan to fly just in local competition, here is a design that is time-tested, having qualified for the U. S. finals twice — at Bong Field, Wis., in 1966, and for the Albuquerque finals in 1970.

The development of Cloud 9 dates back to late 1964, after the West Coast semifinals at Tulare, Calif. I was flying a straightforward, constant-chord model using 14 strands of ¼" Pirelli (see p. 89, Zaic's 1964-65 *Yearbook*). After analyzing the reasons for not placing higher at Tulare, the conclusion was that a model with increased power output was needed, as well as one that would be more sensitive to the weak morning thermals. With these goals in mind, plans were drawn for Cloud 9.

During this time, my close association with Howard Timlin, noted for his Saturn and Solar power designs, served to inspire the lines of the new model. His ships were beautiful and meticulously constructed.

Main considerations for the evolving design were a small stab, around 25%, and a short nose-moment arm, with the CG placed around 60% of chord. These changes from the previous models resulted in buoyant, thermal-sensitive glide characteristics. The aspect ratio was increased, and thinner airfoils with lower profile thickness were employed. A 16-strand motor was used, coupled with a 22" dia. x 26" pitch prop. This combination seemed to take the best advantage of the reduced drag. All of these factors resulted in a model with good penetrating qualities and excellent early morning still-air time, averaging around 3:30.

Two variations of the basic Cloud 9 layout were built during the time the 50-gram rule was in effect. The first model employed the Benedek B-7406 f. The use of this airfoil resulted in superior still-air times, but the second variation using the B-6405 b section seemed to have better penetrating qualities in all types of air. When the new 40-gram rule came into effect in 1966, a new variation was built to its requirements. This model had the same basic layout, but with reduced areas and thinner airfoils. The idea was to minimize drag as much as possible and shoot for altitude. Although performance was good, it couldn't compare with the climb and glide qualities of the original Cloud 9 layout, which is presented here.

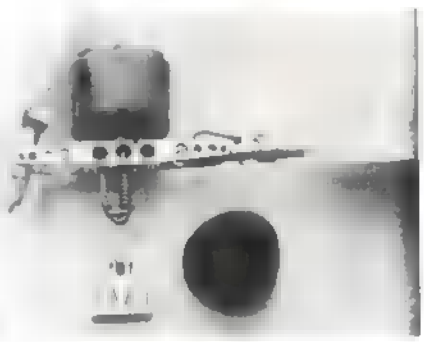
The only major modifications made to convert the orginal for the new rule were in the location of the rear motor anchor and in the propeller design. It was decided that a further reduction in diameter and increase in pitch were needed, along with a reduction in blade area at the tips. Still, the goal was altitude with a high-power, short-burst climb. The new propellers took best advantage of the limited amount of energy available in the 40-gram, 16-strand motors, although prop time was only around 29 seconds.

The front end assembly might seem a little far out, but certain basic considerations led to the use of this system. The inner portion of the prop blade was eliminated, since it seems of little or no value. The system lends itself extremely well to replacement of damaged blades or to experimental pitch variation.

At Bong, Cloud 9 performed as well as any Wakefield in the field. However, because of the builder's poor judgment, the new model was not adjusted well enough for the tur-

Continued on page 87

Although an FAI Wakefield is not fast, streamlining and low-drag airfoils with wrap-resisting structure improves performance.



The entire plane, including the ball-bearing streamlined prop assembly, took six years in development. Has interesting rubber hook.

Fuselages. Entirely plywood, lengths cut to specs, now available. Order should include total fuselage length, length of radio compartment (usually same as wing chord), and length of nose (wing LE to firewall). Overall lengths of 41-48" are offered. Assemblies have rounded upper surface, flat bottoms. Intended for low-wing designs, fuselage is cut to suit wing section. Firewall is ¼" ply; formers fore and aft of radio compartment, ⅛" ply; 3/16" balsa doubler on each side, from firewall, runs well back of wing. Fuselage bottom to rear of wing area cemented in place. Nose area left open for tank and LG installation, but ply piece to fit is included. Any size within limits noted above is $25 to order, two-three week delivery. **P-B Company**, 2695 Kings Park Circle, Decatur, Ga. 30034

Fokker Triplane, introduced at the 1969 Rhinebeck WWI meet, is fitting ¾" scale companion to VK Model Aircraft's Nieuport 17. Construction is similar. Price not set. Kit will include trimmed cowl, formed center-wing fairing, special metal fittings, full-size wing and fuselage decals. Test models weigh about 5¼ lb. with 12-oz. radio installations. Flying characteristics surprisingly good. Scheduled for Sept. release. To keep track of its progress, send stamped, self-addressed envelope for a copy of the *VK News-Views*. **VK Model Aircraft Co.**, 8072 Main Rd., Akron, N. Y. 14001

The **Aero J** is designed for full aerobatic performance, will carry engines from 40-60. Kit features full-length fuselage sides, spruce wing spars, many pre-shaped balsa blocks, top and bottom wing planking. Span 52"; length, 43"; wing area, 498 sq. in. Ready to fly, Aero J weighs 5 lb. Kit, $39.95. **Mar-Kel Model Co.**, Box 27148, Columbus, Ohio 43227

Dee Bee is back in the **ARF plane** field with a whole new line. Hottest performer, the Lance, is not intended for beginners! Has 60" span, 595-sq.-in. wing, 14% airfoil, weighs 5½ lb. ready to fly, intended for 60 engines. Foam wings covered with sheet plastic at factory; plastic fuselage molded from much heavier stock, internally strengthened for adequate stiffness. Assembly rapid, since control surfaces are already covered, and many parts are cemented into fuselage. Lance kit $54.95. Mod-One, not quite as hot, has a bit more wing at 62" span and [illegible] sq. in. area. Similar construction but different fuselage shape; intended for upright engine. Flies well with 45-60 power. Kit, $48.95. Either plane available in red, orange, yellow or blue. **Dee Bee Models**, West Lambs Rd., Pitman, N. J. 08071

Wing **Avenger** stunt plane can be built in either FAI version (span, 67"; area, 660 sq. in.) or AMA version (span, 61"; 610 sq. in., area), both shown on plans. This semi-midwing craft has ample fuselage side area for knife-edge flight and is designed for [illegible] power. Primary parts kit ($65) includes quality fiberglass fuselage, formed belly plate, molded canopy, foam cores for wing and stab, complete plans. Same kit with Olympic retractable landing gear, nickel-cad battery pack and two microswitches, $119.95. LG units designed to minimize electrical interference. Tricycle retract gear system with battery adds about 8 oz. One battery charge enough for 30-50 retractions. **Wing Manufacturing Co.**, Box 265, Elmwood Park, Ill. 60635

Semi-scale **Fleet Biplane** — span, 45"; wing area, 580 sq. in.; weighs, ready to fly, 37 oz. without radio installation. For full-house controls, has strip ailerons. Kit includes formed aluminum LG, molded vinyl engine cowling, fuel-proof decals, molded foam wings. Fuselage built-up construction. For

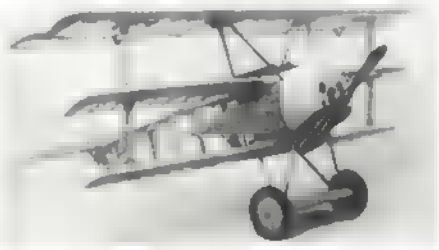
Partially assembled plywood fuselage shells take any wing. Produced by P-B Company.

PHOTOS / BILL [illegible]

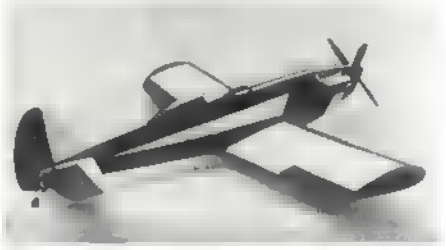
TEXT / [illegible] McENTEE

NEW PRODUCTS CHECK LIST

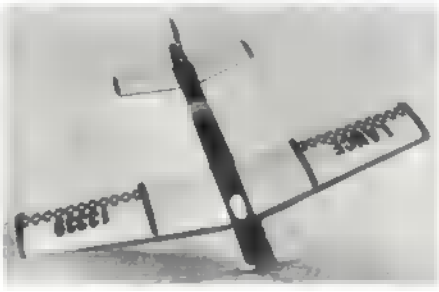
These products seen at the major 1970 model airplane and radio control trade shows.



Fokker Triplane from VK uses 45-60 engines. Many little parts, but fairly fast assembly.



Sporty Aero J offers aerobatics with 40 to 60 engines. Made by Mar-Kel Model Co.



Vinyl plastic featured in new series Dee Bee Models. Ready-to-fly in just hours.

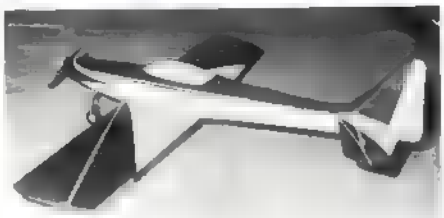
Avenger from Wing has beautiful fiberglass fuselage, foam wings, FAI or AMA versions.

Little foam-wing Fleet Biplane from Sig Mfg. is great sport flyer. RO through full-house.

Fun-flying MiniMaster by Andrews is scaled-down version of Sport- and TrainerMaster.

Small European-style stunter, Slicker from Indy RC, 15 to 40 engines. 425 sq. in.

Goldberg's big new Ranger is molded plastic ARF. Flies FF, RO, full-house.



Nelson Model Products imports German Rowan II glass/foam kit. 16% laminar wing.

Piper J-3, all-time favorite, big kit from Span Aero Products. 8' wing. engine.

New from Sherlock Aircraft — a big 727 jet for one 60 with prop. Span, 5½; length, 6' 9".

DuBro's Sea Bird, of foam, plastic, and balsa, is stable-flying seaplane for 40 to 60 motors.

Nifty ¼A RO Racer is all-plastic. An ARF from Airtrol. Fast flyer needs light radios.

New concept in ARF design uses cardboard, foam, and wood. From Warner Industries.

15-19 power. Fast construction, realistic appearance. $15.95. **Sig Manufacturing Co., Inc.**, Montezuma, Iowa 50171

Low-wing **Minimaster** has lines similar to maker's Sportmaster, but span of only 49"; wing area, 416 sq. in.; length, 39". Swept-back wing leading edge, trike LG and strip ailerons. Weighs 3¾ lb. in flying trim, designed for 19-35 engines. Price $28.50. **Andrews Aircraft Model Co., Inc.**, 2A Putnam Ct., Danvers, Mass. 01923

Slicker, all-balsa, easy-to-build, European-style stunter, has a fuselage somewhat similar to the Bosch lines, which affords plenty of side for knife-edge flight. Wing has 425 sq. in. area and full symmetrical airfoil. Trike landing gear. Designed by Dave Bales. Webra 20 engine recommended, although craft can carry 15-40 power. Fully stuntable. **Indy RC Specialties**, 10538 Jessup Blvd., Indianapolis, Ind. 46280

Ranger 56 looks like blowup of maker's Ranger 42, but construction is different. First model has all-foam fuselage, but formed sheet plastic fuselage was found superior. Hardwood strips run full length sides. Doubler sheets are epoxied to formed sides and bottom; engine bearers also epoxied. Three formers in fuselage rear section. Span is 56"; area, 455 sq. in. Has been flown FF, and with radio RO to full-house. Engines from 19-35. $39.95 kit includes full set of hardware and fittings, steerable gear. **Carl Goldberg Models, Inc.**, 2545 W. Cermak Rd., Chicago, Ill. 60608

Rowan II FAI stunter in kit form by German firm, **Rowan GMPH**. Fiberglass fuselage has integral fin, wing fillets and canopy shape. Foam wings are sheet-balsa covered, using epoxy cement. Wing span 65"; area, 715 sq. in. Designed for minimum assembly time, either FAI or AMA stunt pattern. Airfoil 16% laminar flow. Kit, $94.95. Imported by **Nelson Model Products, Inc.**, 1414 W. Winton Ave., Hayward, Calif. 94545

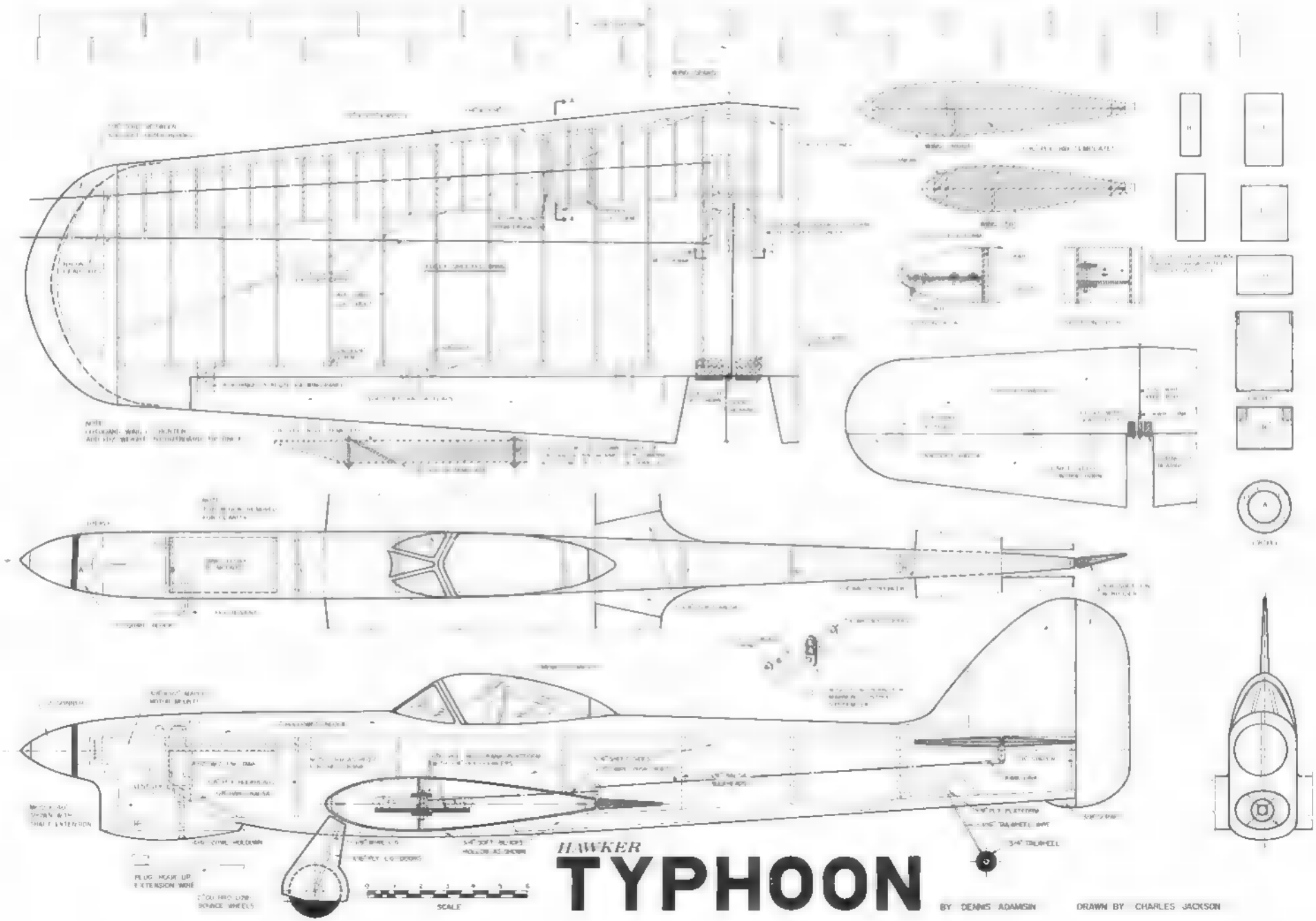
Impressive semi-scale **Piper J-3** at **Span Aero Products** display Kit features aluminum wing spars and wing tips, fiberglass cowl wheel pants. Span , for 60 engines, flying weight under 9 lb. Shown with special version of the new Ross Twin engine. It has rectangular cylinder heads and fin shape — looks something like the real "flat four" Large detailed drawings included. Kit, $79.95. **Span Aero Products**, Box . Norwalk, Conn. 06856

727 Jet Liner, another in this firm's line of all-plastic semi-scales, dominated table of Sherlock Aircraft. Has 5½' span, fuselage 6' 9" long. Craft weighs about 9 lb. ready to fly. Pods dummies, the usual Sherlock design; powered by engine on nose — a hot 60. Price not available. **Sherlock Aircraft Models**, 1275 Dana Ave., Palo Alto, Calif. 94301

Sea is an impressive combination of balsa, plywood, foam, and molded plastic parts. All fittings for equipment installation included are corrosion resistant. Plenty of stunt capability. A 40 is sufficient power but 60 OK. Instructions fully cover model's painting. $59.95, **DuBro Products, Inc.**, 480 Bonner Rd., Wauconda, Ill. 60084

Rivets, nifty all-plastic ¼A racer from **Airtrol**. Single-channel model needs light equipment, very fast. **Airtrol**, Adrian, Mich.

New concept of wood, cardboard, and foam distinguishes the **Cherry Bomb II** sport model. Uses engines. Complete line of ARF models using this manufacturing technique anticipated. **Warner Industries**, 259 Hosack St., Columbus, Ohio 43207


HAWKER
TYPHOON
BY DENNIS ADAMSIN
DRAWN BY CHARLES JACKSON
SCALE

HAWKER TYPHOON

Slick semi-scale Nats winner was designed, described and pencil-drawn by 14-year-old Junior Stunt Champion.

DENNIS ADAMISIN

"IT certainly separates the men from the boys!" Such was one pilot's evaluation of the Typhoon. When it proved to be an ineffective high-altitude fighter, the Typhoon seemed doomed. However, it later saw action as a ground-attack support fighter.

This model represents a phase of stunt design which has featured jets, Goodyears and originals. The Typhoon is the first semi-scale airplane in this group, but it has some of the features of earlier models. It is definitely the best ship I have had, and I am building another one for a spare.

The paint scheme is semi-scale, different, flashy, and easy to do. The camouflage is green and brown; the green sprayed first and the brown air-brushed on later. The bottom is yellow with black diagonal stripes. The first two letters of the identification are red, the last letter is yellow and the letters on the rudder and the nose are white. The band on the back of the body is light blue. The white letters on the cowl read, "If this engine catches fire on starting, don't just wave your arms at the pilot, try putting the bloody thing out as well." The letters on the side of the body just ahead of the elevator read, "If fate decrees that I should fail, then fate will not have watched my tail." These two tidbits were on the real Typhoon.

My best flights were made with this airplane when it was flown slow and smooth. Not to say that it won't fly any other way—but who knocks success? The Nats' victory was mine after only one official flight! The advantages of flying smooth, instead of by the book, are several. It's easier to fudge in at the right altitudes, especially at the bottoms of everything. Most important, bobbles and "bombing out" on the bottoms of the square maneuvers can be avoided. Less practice is needed and one can stay in practice longer. A smooth pattern impresses the judges because, without all the bobbles and imperfections of a square pattern, a smooth pattern just naturally looks better.

A few general comments on Stunt should be made. First, many fliers are unhappy with the AMA method of scoring. Some would like to change the point values or adopt FAI scoring; others have their own systems. All these proposals have the same

Continued on page 84

Psychedelic paint job on the plane's underside is for real. Colors are copied from a Profile Publication showing a target tug. It really catches judges' eyes—a help in winning.

	three in. wide	four in. wide
1/16"	9-10 grams	11-13 grams
3/32"	13-15 "	16-20 "
1/8"	18-20 "	22-26 "
5/32"	27-30 "	33-39 "
1/4"	36-40 "	44-52 "
3/8"	54-60 "	66-78 "
1/2"	72-80 "	88-104 "
3/4"	108-120 "	132-156 "
1"	144-160 "	176-208 "

THIRTY HOURS TO A FLIGHT

GETTING STARTED IN R/C

Full-house means four controls. Some sets have more controls, here are some uses for them.

HOWARD McENTEE

THIS month's topic is auxiliary controls, what they do and how they may be operated. Although this series is devoted to matters of interest to the RC beginner, who usually flies with rather simple equipment, some of the more advanced beginners may be wondering what to do with the extra controls found on many of today's digital systems. Four controls generally are needed for the most versatile flying — either sport or competition. They are rudder, elevator, ailerons and throttle. This is often termed a full-house control setup.

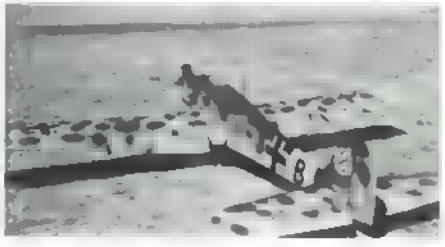
Quite a few auxiliaries can be operated from one or more of the normal full-house controls, or even from simpler controls such as rudder and throttle. Most multi-control planes today have a steerable nose or tail wheel and some form of brakes. Ground steering is almost always accomplished by an additional linkage to the rudder servo. Brakes are often operated by full down movement of the elevator servo (on trike LG planes).

Brakes come in many forms, but are basically mechanical and electrical types. For actuating the former, a cord is tied to the elevator linkage and led by means of grommets, pulleys, etc., to the brake levers at one or two wheels. A nose-wheel brake is quite effective, and the linkage is simpler than brakes applied to the two main wheels of a trike-gear plane. Electric brakes can also be operated by down elevator, but here the elevator linkage triggers a switch in the extreme down position. Down elevator is favored because full-down is used less than full-up. With electric brakes it is quite easy to obtain differential steering of two wheels. This means the brake may be applied on either wheel at will, or on both wheels together — a great advantage when taxiing in a strong wind (brakes on practically all full-sized planes operate this way).

Continued on page 72

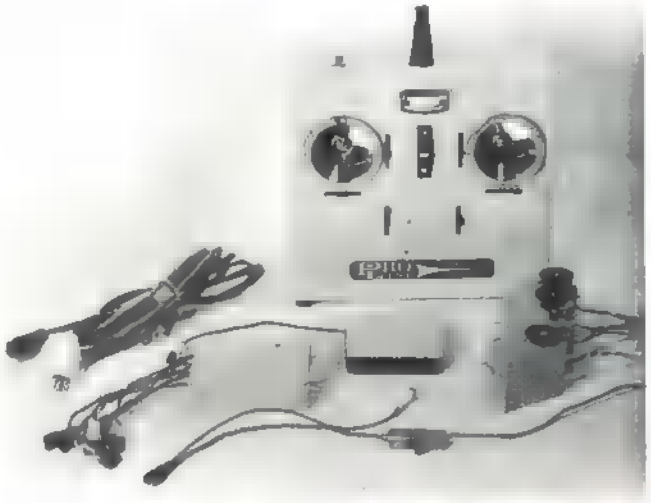
Retractable landing gear on stunt ship.

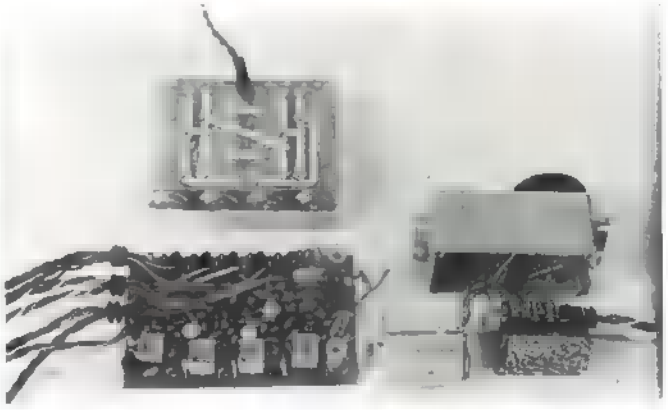
How to drop a parachute (or eggs?) on target.



Landing flaps on scale types are common.

Radio-controlled Shark 45 with stunt flaps.





The unique features of this system are shown above. First note PC board in battery pack with diode fail-safe, bridge amplifier circuit in servo, and four-stage IF strip in receiver.

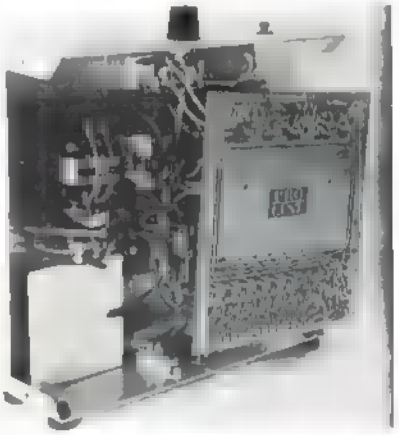
R/C TECHNICAL FEATURE

Pro-Line Competition Six

A Blue Ribbon Review

FRED M. MARKS

PHOTOS: FRANK PIERCE



Transmitter uses Kraft-Hayes sticks and other fittings. Neat assembly is evident. PC board is plated and moisture-proofed.

PRO-LINE is a relatively new manufacturer of digital systems. Even so, its Competition Six is an evolutionary system. Pro-Line has in its organization Jim Whitley, of contest fame, and Jim Fosgate. Jim Fosgate has designed equipment that a lot of people have used to win, first with other manufacturers and now with Pro-Line.

There always are several key people with each manufacturer; one is the designer of the circuitry, another the mechanical designer. Usually, the circuit designer has had many years in the industrial electronics complex. A master machinist takes care of the die-making and production of plastic parts. In the case of Pro-Line, however, the latter is taken care of by liberal use of Kraft plastic components, including the KPS-10 and KPS-11 servomechanics, battery cases, stick assemblies, antenna fitting, and switch guard.

The primary differences between the Pro-Line and others is in the electronic circuitry — primarily in the receiver design and in the use of a bridge amplifier in the servo to permit a two-wire battery pack.

System Description: The transmitter is 7 x 6½ x 2". The case is clad in ivory-colored vinyl. Kraft stick assemblies were used on the test set. The transmitter also is available in a single-stick open gimbal, or two-stick open gimbal arrangement. The two auxiliary tabs are located near the center of the case below the sticks in the two-stick versions, and are located on the right hand end for the single-stick system. It seems all manufacturers set up the standard single-stick transmitter for right handers; I presume left handers can obtain a left-hand at added cost, on special order.

Pro-Line uses a unique new switch guard designed to prevent inadvertently turning off the switch while fumbling for a trim lever. While I appreciate this concern, I found it rather a nuisance, because the switch doesn't protrude far enough.

A buddy-box arrangement is provided. Each transmitter is capable of being used as slave or master, determined by selection of the direction in which the jumper cable is connected. This concept is described in the August AAM review of the Kraft system. The enable button is visible at the top left of the transmitter.

Internally, the encoder and RF sections are mounted on a common PC board attached to mounting brackets on the back of the stick assemblies. The 9.6V battery pack is housed in two of the same battery cases used for the airborne pack.

Electronically, the transmitter presents two departures: the repetition rate varies with pulse width and the input to the final amplifier is full 1100 milliwatts (1.1 watts). A 600-milliwatt output is claimed, indicating a rather conservative efficiency of less than 60 percent. This output is obtained with a transmitter drain of 130 milliamperes which, with the 500 mah cells used, gives a safe operating time of about 3⅔ hours continuous operation.

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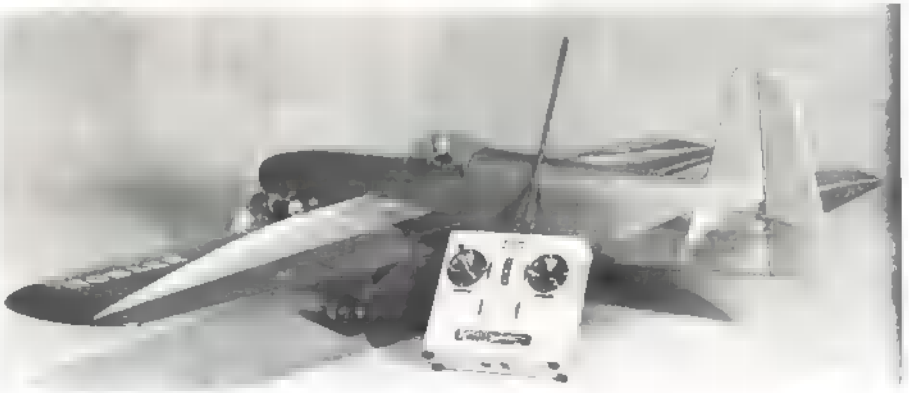


Flight-testing done in Top Flite RC Nobler built from the kit. Used S.T. 46 for spectacular climb performance. Coupled flaps.

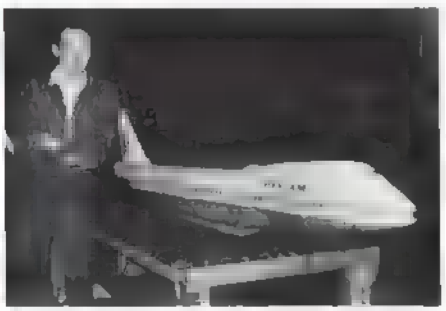
C/L BILL BOSS
General Correspondent
SPORT and SCALE

Fly Well — at Low Cost: Who said model building has to be expensive? It doesn't, when corrugated cardboard is used for fuselage bulkheads and wing ribs, and yardsticks from the local hardware store, for spars. W. A. Dahlgren has utilized these items to beat the high cost of materials. When he returned to active model building after a five-year retirement, Dahlgren was shocked when he found how the prices had gone up — hence, his search for materials that would do the job at little or no cost.

The Skyvan and Combat planes are samples of what Dahlgren did with simple materials and a little ingenuity. The Skyvan has bulkheads and wing ribs cut out of empty beer cartons, while the Combat ship has three yardsticks to form the leading and trailing edges and its wing ribs are cardboard.

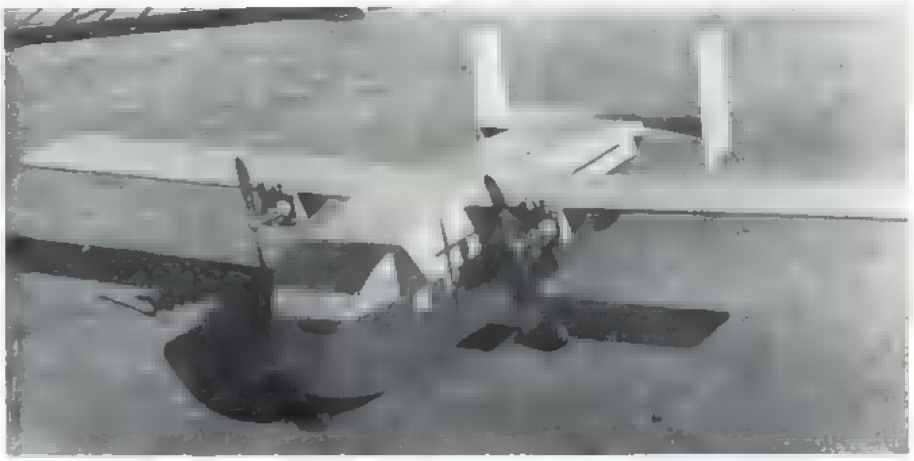
When using these items, it is important to select the proper materials (hardwoods, plywood, etc.) for bellcrank mounting and the other stress points. Careful use of inexpensive materials will provide a good-looking, good-flying plane — at a much reduced cost. . . .

Jumbo Scale: Myron Pickard, an employee of Pan American World Airways and member of the PAN AM Aeromodelers Club at Kennedy International Airport, has put his modeling experience to good use on the job. Myron has fabricated fiberglass fuselage models of Pan Am's 747, which weigh approximately six lbs., are eight ft. long, and which were developed as an aid in maintenance of the real 747. (While the model in the photo is a full fuselage, Pan Am's

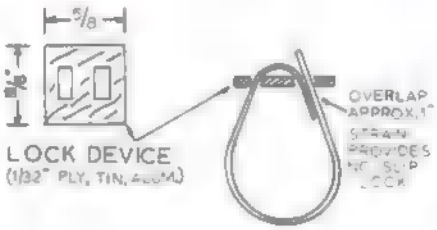


All fiberglass 747 for Pan Am may become a giant prop-powered flying model. See text.

Fuel-line guide by Sal Calato prevents line from being melted by hot engine or exhaust.

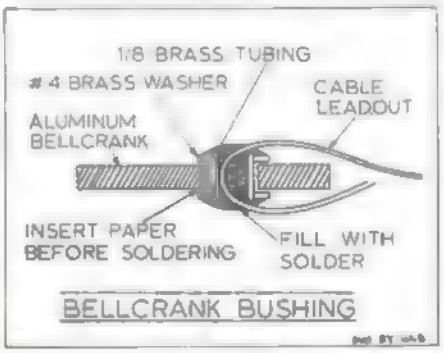


Inexpensive all-cardboard version of Skyvan (AAM Jan. 70) cut out of grocery boxes by W. A. Dahlgren is just as strong and light as balsa version. Uses two Cox or Testors 049's.



PROFILE TANK TIE-DOWN

Free tank holder for Profiles made from plastic package strap and simple lock device.



BELLCRANK BUSHING

Better bellcrank bearing for leadouts made by filling eyelet with solder. By Bill Noyes.

open fuselage halves fitted with stringers and bulkhead stations.) The 747 mock-ups used instead of charts to designate the various areas, hatches, etc., that have to be inspected for routine maintenance.

Myron said that the most difficult part of making the models was carving the pattern used for molding the fiberglass from a 55-lb. piece of redwood. As an RC and CL flyer, he is considering the completion of the entire plane in fiberglass and powering it with ducted fans. This *has* to be one of the most ambitious scale projects on record. . . .

Tinted Canopies: For snazzy tinted canopies, a wide variety of colors can be had from the Kandy-Kolor spray paints sold for model custom cars. The colors are translucent and come in any shade including Tangerine Metalflake — sounds real wild. Best results are obtained by spraying the paint on the inside of the canopies before installation in the model, since the paint is not fuel-proof. This suggestion comes from Aero Angels Newsletter (Glenview, Ill.).

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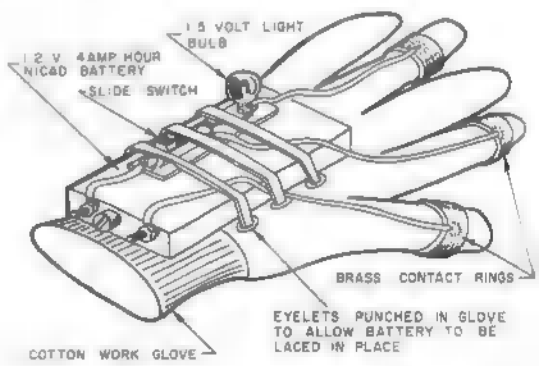
C/L JOHN SMITH
Specialist Correspondent
SPEED and RACING

No News Is Good News: "I just finished reading your June column and would like to add to the discussion of safety factors in control line Speed Events. A large number of contestants seem to prefer using undersize lines to lower resistance. This practice makes the downwind side of the circle a no man's land. Wouldn't it be a good idea to have the organization sponsoring the meet install pylon structures similar to those described in the magazine a year or so back? Flying would be done from outside the circle and the line would be of sufficient size to give a margin of safety. All contestants in each class should use the same or similar line, thereby equalizing all but the airplane itself. The black art of whipping also would be eliminated."

Before everyone jumps on the band wagon, the above quote should be qualified. It was written to The Readers Soap Box, *Air Trails Magazine*, August 1946. The writer was Don Conaway, Warren, Pa. Are you still with us, Don? If so, drop me a line. The outside-the-circle pylon is not used yet, and the black art of whipping is still among us. Someone should have listened a little more closely to you. With the wildest stretch of the imagination, try to think of the fun and games that would result from trying to launch a hot piped 60 job with the pilot sit-



Frank Scott's all-in-one pit stop glove for CL racing crew also checks condition of plug.

ting outside the circle. With ▬ of the hot-shots flying today, the center of the circle is the safest place to be. The pits could be put in there, the timers around the pylon — then there's the coke stand and the pull test! . . .

Help The Kid Around The Corner: Juniors write asking for help. A good example is B. Bosco (Tempe, Ariz., Mesa Corsairs), who is just starting to fly speed, also Goodyear and Rat Racers. He says his flying buddy, Ken Tom, is the only one in the valley who flies speed. He asks ▬ good questions about dollies. Each flier has his own ideas about these, and also needs equipment, single wire units (hobby shop owners should stock these — they are available!), and hints ▬ engine work. Mesa Corsairs, take good ▬ of this member and give him some help. We need junior members today. . . .

Pitman's Glove: The drawing from Frank Scott shows a simple pit glove, which is self-contained, uses a 1.2V, 4 amp-hr. nicad to light the plug. He says the battery will last all season without recharge. Also checks plug condition. To quote Frank, "One needs only to slip this glove onto the left hand, turn on the switch, and he becomes a pit man — assuming that he is keen of eye, fleet of foot, and has a fearless right hand for snatching the speeding model." Well said! . . .

Club News Letters: Thanks to all who have sent their club papers. (I'd be happy to hear from others, too.) The Southern Calif. C/L Association stands out. Edited by Lynn Bowan, it runs about a half dozen pages each issue. This active association, with many contests, spends half the time in meetings, although it must pay off. They even fly two-wire Speed Fly-For-Fun contests. . . .

C/L JOHN BLUM
Specialist Correspondent
CARRIER and STUNT

Stunt Rules Philosophy: Jim Silhavy's proposal for eliminating appearance in AMA Stunt, paralleled by Tom Niebuhr's comments, has prompted many responses. Interested stunters appear to fall into three major categories: the fliers, the builders, and the sportsters.

The fliers, driven by the challenge of mastering ▪ perfect pattern, feel Stunt is intended to be a flying event. Members of this group say that they, as well as others, build to a perfection which satisfies them, regardless of rules and scoring; thus, the rules hold down participation ▬ the event. The builders believe that eliminating appearance points will be detrimental, because stunt models must be highly-finished with much detail. Some advocate that Stunt be a semi-scale event. The third group, ▬ the sportsters, falls somewhere in between and feel the rules should be left well enough alone. . . .

Is Modeling Expensive?: Capt. Jack E. Sayer, writing from Nassau, Bahamas, comments on U. S. modelers' complaints about the cost of engines, kits and equipment. His itemized bill of materials for a Monocoupe with a Cox 15 totals $46.66, including necessary building and flying supplies such as pins, lines, battery, etc. This he compares with a cost of $28.00 in the States. He relates that in the Bahamas glow heads or engine parts are not available and one may as well forget RC equipment. . . .

FAI Stunt Models: Jim Kostecky sketches an idea for ▪ knock-apart FAI Stunt Model.

Model features (1) removable foam wing, (2) removable tail surfaces, (3) removable dural gear, (4) radial mounted engine, (5) muffler channeled down fuselage center.

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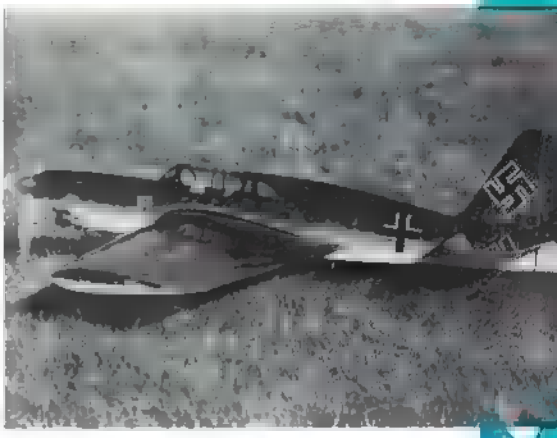
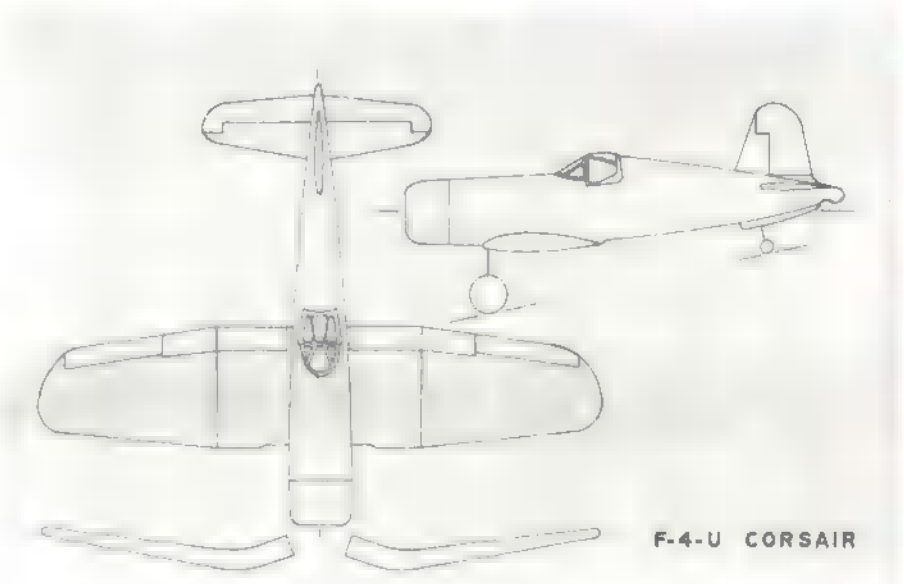
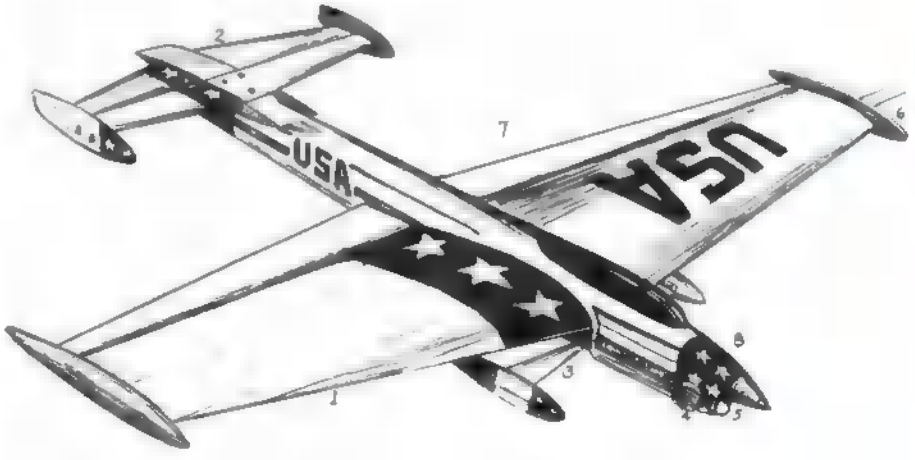
For Carrier event, gull-wing fighter, the Corsair, takes more building, flies well.



Mark Freeman and Bob McKinney are trying for more nearly scale control line Stunt ships, the FW 190 and ME 108 respectively. Note plane at left has coupled rudder.





1. REMOVABLE FOAM WING
2. REMOVABLE TAIL SURFACES
3. REMOVABLE DURAL GEAR
4. RADIAL MOUNTED ENGINE
5. MUFFLER CHANNELLED DOWN FUSELAGE CENTER
6. TIP PLATES
7. MONO-KOTE FINISH
8. FIBERGLASS COWL

Jim Kostecky's proposed stunter for no-appearance points judging has built-in muffler.

F/F BOB MEUSER
General Correspondent
SPORT

Taibi Tells All!: It is no accident that the spars fit the notches, the ribs are identical, the hardness of each stick is appropriate to its function, and that an assembled Starduster comes out with the correct weight and balance. A free-flighter from way back, Sal Taibi not only designs the models produced by Competition Models, he also weight grades all of the balsa planks and saws the stock. The ribs are stamped out with the same kind of steel-rule dies used for stamping cardboard cartons, as are those of other kit manufacturers, but there is a difference. Sal, an experienced tool and die maker, makes his own dies!

In the late fifties, Sal heard about Frank Green's success with a high-thrust-line model, made a HTL model himself, using the proportions of his highly successful Spacer. Sal hacked away at the rudder until "dutch roll" became evident, put back half a square inch. When no bugs showed up in the half-dozen duplicates built by his buddies, the Starduster went into production, and free flight hasn't been the same since! Then, when the hot Cox TD 049 was introduced came the Starduster-X, later the 350, and, for the larger mills, the 600 and 900. He has produced 60,000 ½A competition models alone!

Look for his 020-powered sport model, due in the shops this fall. It qualifies under Payload rules. . . .

MonoKote HLG Sets Record: Marty Thompson set a new outdoor hand-launched glider record at the SHOC Annual at Taft, California. This same glider flew for over a minute in the Cow Palace (3-view appeared in this column, April AAM). Marty thought he had set a record a week earlier, but it turned out that Brian VanNest nosed him out by two sec. on the same day, 100 miles away!

Prop Pitch Gauge: In olden times we carved props — nowadays we carve or mold prop blades. To attach the blades to the hub at the proper angle a quickie gauge of some sort can usually be cobbled up out of scrapwood at the workbench. But, at a con-

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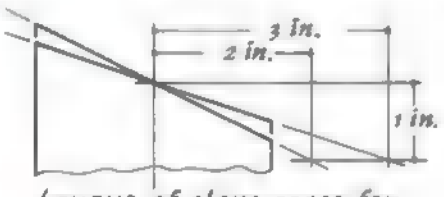
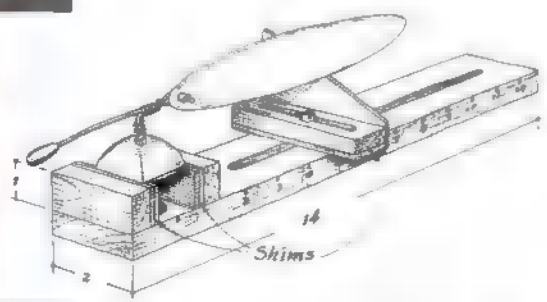
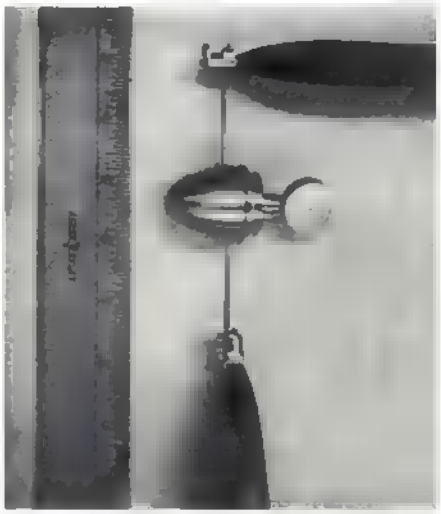


Layout of slope gages for slopes of 1:2 and 1:3.

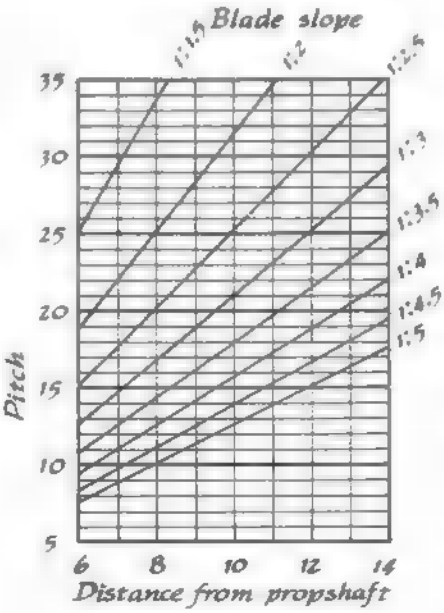
Once the pitch angles are theorized, making them can be a chore, but with this handy tool and a graph, it is simplified. Also, blade replacement at a contest will be accurate, not haphazard. Pitch should decrease toward tip where airflow speed is faster. Different gauges can be prepared for each propeller.

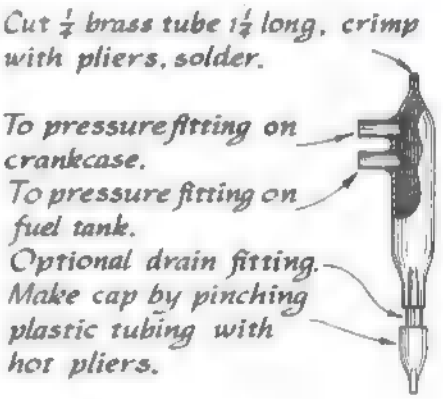




Now that you have a gauge for prop pitch, consider Bob Wilder's controlled pitch prop unit which changes with rubber torque output. Smoother, more efficient climb achieved.

Ray Glab's original 010 Powermouse sport model should last for hundreds of flights with that protective landing gear. Wheels also useable for pitch trim by drag.

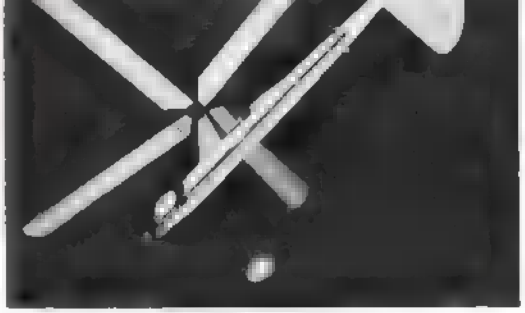




Ray Faulkner device prevents over-run.

F/F BUD TENNY
Specialist Correspondent
INDOOR

Minimum Weight Indoor Models: This topic, mentioned here a past months, also came up at the World Championship. A one-gram minimum model weight, coupled with



Wingless autogyro makes snappy flying demonstration. Fudo Takagi caught Hannan's Tyro-Gyro in action. Lots of blade area.

one gram of rubber, was discussed favorably. Quite coincidentally, a survey is being circulated to U. S. indoor fliers by *Indoor News and Views*. The survey's preliminary results tend to indicate that modelers here would accept the minimum weight model concept. . . .

The Survey: A three-event format, based on 65-cm wingspan models, was postulated in the survey. These events are a three-gram beginner or novice event, a one-gram regular competition event, and an expert class with no minimum weight. This last event corresponds to the existing AMA events. . . .

Outlaw Ceiling Contact?: The survey also asked if ceiling contact should disqualify regular AMA indoor flights. About 30% of those who favored the new events want to retain the choice of rafter-banging or ceiling-scrubbing without penalty, at least for those events with a weight limit. Under ideal circumstances, elimination of ceiling contact should focus attention on model performance, and minimize luck in avoiding trouble during ceiling contact. Several fliers expressed the idea that any ban on ceiling contact should be applied only to the expert event. . . .

The Pennyplane Again: The most enthusiastic supporters of the minimum weight models are those who have flown the Penny-

Continued on page 76

F/F WALT MOONEY
Specialist Correspondent
SCALE

Orbiteer's Scale Contest: Friendly competition, inspired by the opportunity to make unlimited numbers of official flights, finally raised the top rubber scale flight time to the high of three minutes. Fudo Takagi put his small Pilatus Porter up for this winning flight time at the Orbiteers' second monthly Scale contest. Times were recorded only if they were better than any of a contestant's previous attempts. Even so, six flights of over a minute and 15 of over 45 seconds were recorded. The contest had a total of 22 entries.

First place in open was Fudo Takagi's Pilatus Porter as far as flight time went, but, after the Scale judging, Bill Pardoe's Curtiss SOC-1 was in top position (best flight, one minute and two seconds). Then Kelly Pardoe made it a family sweep by taking Junior. His Rearwin Speedster had a best flight of one minute and twelve seconds. . . .

Beautiful Scale Models: Bob Clemins is a modeler who makes beautiful little rubber scale models and takes great photo-

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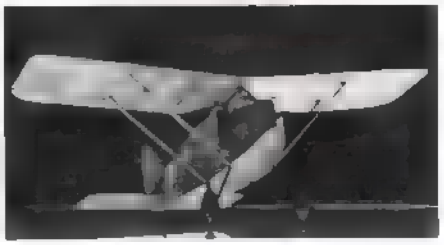
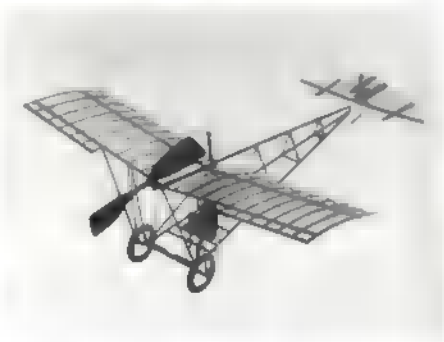


Waterman Gosling Racer by Bob Clemens spans 12 inches. Plastic prop, dummy motor.



Where is Santos? Demoiselle is Walt Mooney's Peanut Scale model. Sleek Streek prop.

All balsa Avro 560 is ultra lightweight model. Great flyer but tricky on takeoff.

F/F BOB STALICK
Specialist Correspondent
GLIDER and RUBBER

Preparing for Competition: Our best Nordic and Wakefield fliers (Power, too) soon will gather at Albuquerque to compete for the right to represent the U. S. at the FAI FF World Championships in Sweden in 1971. Those who aren't going to Albuquerque this Labor Day weekend can look ahead to attending the finals for the 1973 team, two years hence.

The best preparation is planning a building schedule well in advance. Newcomers to either Wakefield or Nordic should do

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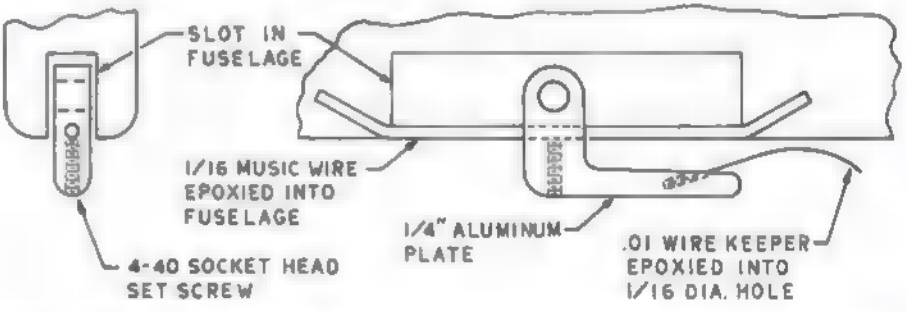
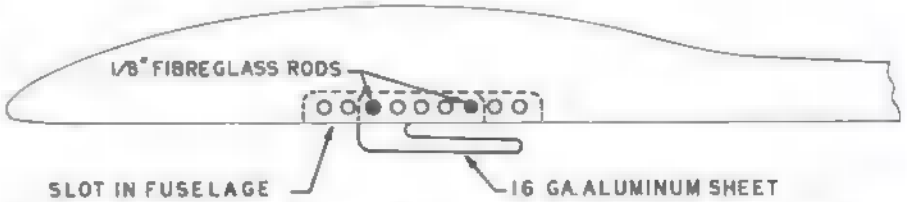
Marvin Jordan helps Jim Wright with "Sans Egal" in A2 Nordic. Remember, flyoffs for the U.S. Team at Albuquerque, Labor Day.

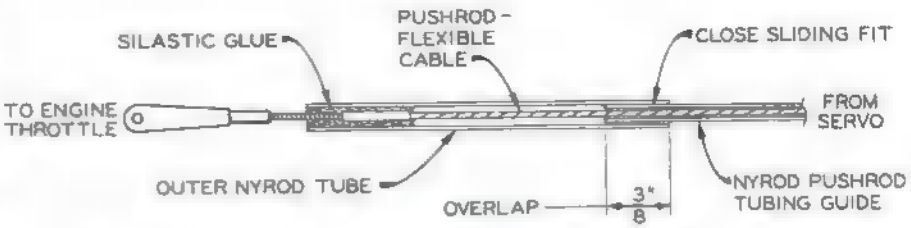


Steve Helmick has infinitely adjustable hook made from ¼-inch thick aluminum. Interesting gizmo is light ring keeper spring for thermal hunting. Epoxy wire firmly.



Got a favorite tow hook? Send it in. Here's Brian Fairley's sheet aluminum hook which slides in fuselage slot. Great for hardwood glider noses. Adjustment range is just adequate.

R/C DON LOWE
General Correspondent
SPORT and PATTERN



Throttle cable assembly by Dana Swah prevents the motor mess from entering servo area.

Feedback: Technically-oriented types understand the meaning of feedback and its importance in servo design. It is also important in the writing business, since it stimulates the columnist to do a better job and to rule out any errors in his thinking — much the same as servo feedback provides an error signal which won't go away until the commanded position is satisfied. Feedback is solicited on subjects or issues raised in this column, since it helps to know contact is being made and that the readers' views are being presented.

Jim Mowrey's feedback really was worth a chuckle. It seems that Jim read the first two columns. The April one included a picture of me and my Lanier plastic Pursuit. The May issue showed the Lanier midget in a mid-air collision at the Tangerine Internats in Florida. Jim wrote: "Just a note to let you know I enjoy reading your column in AAM, especially since I consider you are one of the foremost miniature airplane designers in the country. I must admit I was a little shocked at the picture heading your column — a rubber duck. My, my — whatever happened to the Phoenix? Then the next month things were looking up — a balsa plane eating up that rubber duck!" Jim must like balsa airplanes. Shown in this month's column is Jim's balsa Jayhawker which he says evolved from the Phoenix.

The Wankel: Everybody likes diversity. I enjoy trying a variety of gimmicks and gadgets and airplane designs. Usually, I fly digital proportional, but now and then I get a kick out of flying a reed ship (they are rare!) or a pulse control system or single channel, if the opportunity presents itself. Variety in engines is hard to find but the Wankel certainly provides a change of pace — if you can find one! Primarily, the Wankel represents a magnificent effort to cure the biggest equipment-wrecking problem —

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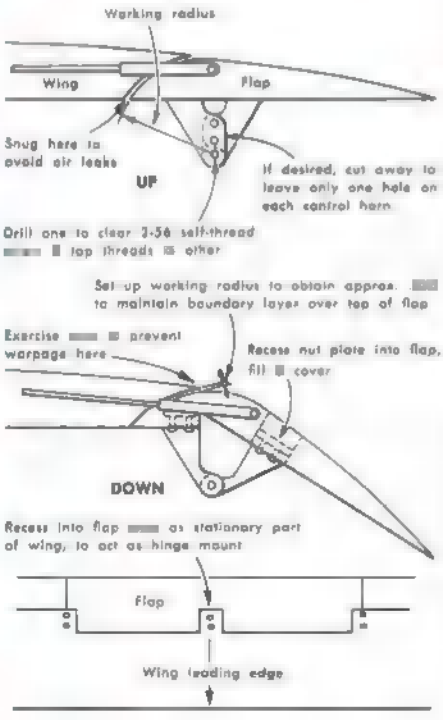
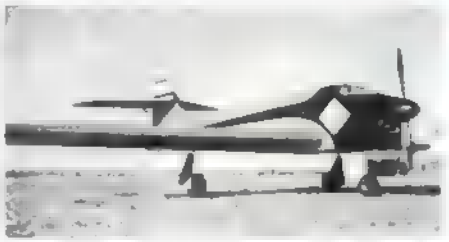




Jim Mowrey's Jayhawker is claimed to have evolved from Lowe's Phoenix design. How?

NASA engineer, John Kiker, displays production Wankel. Available in Germany.

R/C BOB MORSE
Specialist Correspondent
PYLON RACING

Formula II P51 Mustangs: One of the prettiest ships seen in quite a while was Harold deBolt's Formula II Mustang at the 1969 Nationals. Several of these ships were being flown, and all posted times approaching two minutes. If memory serves, Harold won the event with consistent times of two minutes two seconds. The ship soon will be available at local dealers. Harold has been trying for some time to overcome a plywood supply problem and should have it solved and kits on the way by now. . . .

EBRC Pylon Fly-In: One of the first pylon events of the season in Northern California was held April 5 at the East Bay RC Club's San Ramon flying site. Several Formula I ships totaled while trying to set down on the 200-ft. blacktop strip. Garry Korpi, Pioneer RC Club, winning every heat, took home the bacon. He is preparing an all-out assault on the world speed record. Garry and his crew presently are testing several ship and engine combinations, gathering timing equipment and crews, and should have made their attempt by press time. . . .

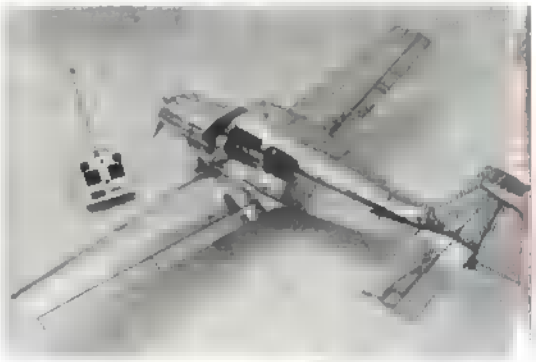
NMPRA: Several changes and new events

Continued on page 79

R/C CLAUDE McCULLOUGH
Specialist Correspondent
SCALE

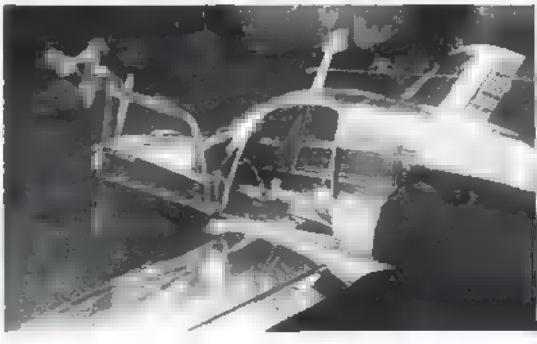
Would You Believe Six?: The most venerable cliche in scale modeling is the pipe dream of an RC model of the B-36, triumphant over all design difficulties. For several years Walt Burgin has insisted it could be done — and with retracting landing gear! As the model's construction progressed, so did its weight. When it hit 18 lbs. fueled at test flight time, some were skeptical of success, particularly when only four Enya 15's were used for the first attempt.

After a run of little more than a hundred feet the silver bird hopped off easily, climbing out at a startling angle. A touch of down trim and, at cruising altitude, a slight cutback in engine power put it right on the money. Handling characteristics were excellent, with smooth, graceful turns. Passing overhead, the sweptback 115" wing looked more like a powered glider than a veritable bomb with a 35 oz. per sq. ft. wing loading, evident proof that a long span and pusher props are efficient. Touchdown was made on the main gear with the nose wheel



Photos by Roy Yates.

Sid Holloway's all-metal Beagle Pup displays fantastic craftsmanship. It is an exact scaled-down rendition of the real plane. Construction is identical. Surprisingly, it is no heavier than a balsa equivalent.



In rough form, Walt Burgin test flew his B-36 on four of six 15 engines. Perfect flight.

raised to realistically conclude a historic occasion when the legend became fact.

Walt is now adding full canopy and scale decor in preparation for the Nationals. Possible Scale Operations points for extra engines — 100! The retract gear is his own design and is basically a winch, powered by a Logictrol II servo, that pulls the gear up with cables. To operate, the auxiliary con-

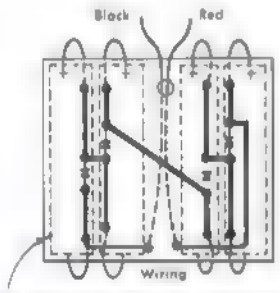
Continued on page 82

R/C FRED MARKS
Specialist Correspondent
TECHNICAL ITEMS AERODYNAMICS

Batteries — the Heart of the Systems: RC technology marches onward. The control technique now in use, digital feedback, represents a high plateau in technique. No marked changes in concept have evolved since the earlier digital sets. However, technology has made some overall improvements. Earlier sets usually had a stack of seven nickel-cadmium cells because of the bias required to use PNP output transistors. Availability of good complementary PNP-NPN transistors permitted the reduction of four cells as now used. Other developments are smaller servo-mechanisms, bridge amplifiers for three-wire-servos, integrated circuits and so on.

The prime goal for all manufacturers is, or should be, demonstration of proven reliability. Those who read the Blue Ribbon Review, August 1970 AAM, will have noted a call for concerted efforts to improve the

Continued on page 80



Dotted line shows 300 mah NiCad cells position

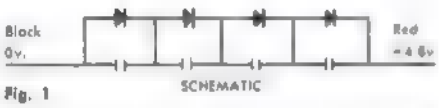


Fig. 1 SCHEMATIC

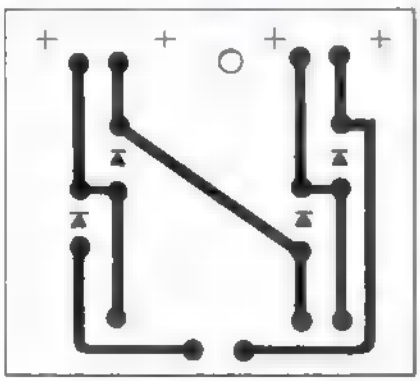


Fig. 2

R/C HOWARD McENTEE
Specialist Correspondent
GLIDERS and FAI

1971 RC World Championships: Main radio control topic presented at the Spring CIAM meeting in London was a discussion of the 1971 World Championships site, scheduled to be held in England (the 1970 Scale World Championships for CL and RC will be at England's Cranfield Institute, Aug. 27-Sept. 1). The U.S. proposed that the competition be held in the States. Several definite commitments as to location, transportation, lodging, etc., had been received by AMA. However, the SMAE (English counterpart of AMA) has stated it definitely wishes to have the RC Stunt World Championships in England next year. It is likely, therefore, that

Continued on page 80

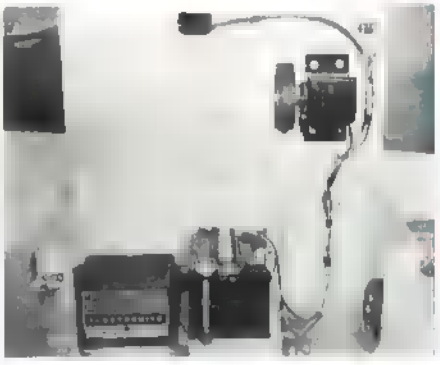
R/C GEORGE SIPOSS
Specialist Correspondent
R/C CAR RACING

RC Car Nationals: The RC Car Nationals will be held in Indianapolis, August 8 and 9. Modelers from many parts of the country plan to attend what should be an excellent event. Dan Powers (of Citizen-Ship Curtis Dyna-Products) is in charge of organization. . . .

News Briefs: Lindberg Products is putting out a large dune buggy kit which can

Continued on page 79

The Cougar racing team is altogether in Orbit.



Charger/battery inside Kelley's car starter.

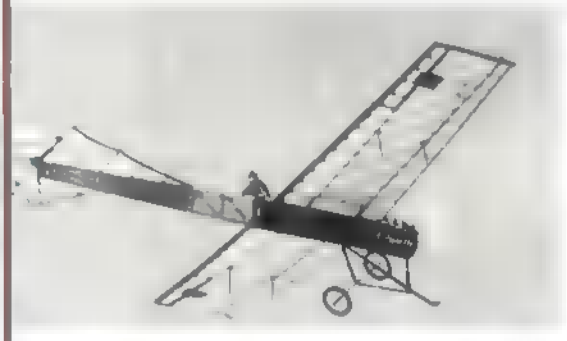
Yankee Wench ROG's while Le Gray rapidly gets hand back to the stick. ROG's are safer. Man at far left holds electric winch button. Cable runs to pulley across field.

All photos Al Signorino

Antoinette

Big, graceful, and slow characterize this much-loved airplane from aviation's early history. Model has 8-foot wings and weighs 9 pounds, yet flies realistically on only ■ 36.

VERNON ZUNDEL AND AL SIGNORINO



Magnificently, he flies past at ■■ incredibly slow speed. At times, the Antoinette thinks it's a glider, making it very easy to fly.

THE Antoinette, ■ lovable ship with ■■■ lines and graceful flight characteristics, was among the greats in early aviation. Named for Antoinette Gastambide, daughter of the company's director, it ■as a favorite because of its handling characteristics and ease of control. Some said the Antoinette could be flown by ■ new student after only three or four hours of training. The engine developed for the original was so popular that it was often used for other airplanes of that era.

The designer of the Antoinette, Leon Levasseur, was an artist who originally designed boats — as is apparent from the plane's fuselage. (During construction of the model, I was asked what kind of sail-boat had silked sides!) If ■ had not been for ■■■ nor problems such as forced landings, the Antoinette might have beaten the Bleriot as the first plane to cross the English Channel. But it did set ■■■■ records. It was the first plane to reach ■■ altitude of over 500 feet. In 1910 ■ set ■ speed record ■■ 48.205 mph (!). It also was ■■■ of the first planes to use dihedral in the wings, ■ concept which was not widely accepted at that time. The Antoinette did have its problems with tab effect, wing trampling, narrow wheel base, etc. But it still became one of the ■■■■ loved airplanes in aviation history.

With the arrival of pilot Hubert Latham and the addition of trapezoidal ailerons to improve lateral control, the Antoinette's performance improved considerably — even to the point of placing second ■■ the Grand Prix in 1909 and setting an altitude record at Rheims in the Prix de 'Altitude. Told by his doctor that he had only a year to live, Latham decided ■■ live life to its fullest and make the most of his remaining days by flying. As ■ turned out, he died ■■■ of the disease or ■■ ■ plane crash, but by a berserk rhino ■■■ an African safari many y■■■■ later!

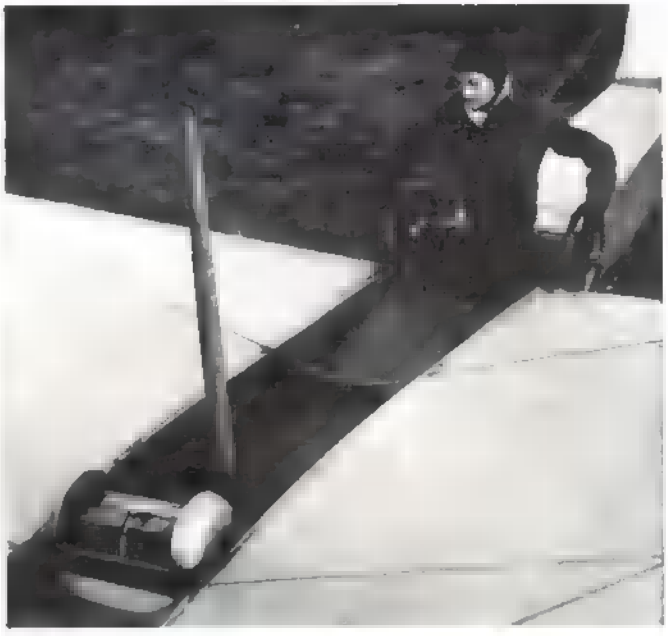
The Antoinette flew again in modern times when it was chosen, because of its unique appearance and ■■■■ as one of the airplanes in the film, *Those Magnificent Men In Their Flying Machines*. To ■■■ ■ was the most graceful of the old machines, and the idea of an RC version took shape. The 2-in. scale model presented here is adapted from the film ship, since some points of the original left much to be desired with respect to modeling. To build the Antoinette for entry in AMA scale competition, some additional research is recommended. When the exact version to be modeled has been selected, compile proof-of-scale material before beginning construction. The March and April 1965 issues of *Aeromodeller* have 2- and 3-view drawings, photos, and data on all the planes that flew in the movie.

We began construction with a set of 3-views from W. C. Hannan Graphics. The book, *Building Aeroplanes for Those Magnificent Men* ($2.95 from John W. Caler, 7506 Clybourn, Sun Valley, Calif. 91352) helped immensely ■■ overcoming some of the difficulties encountered in the reproduction of this magnificent machine. In spite of all the reference material, some modifications had to be made to achieve a stable, structurally sound RC plane. The two major changes were a conventional airfoil and a ■■■■ forward landing gear location. A small amount of lead (one pound) was added to locate the center of gravity at 33% of the chord.

Construction

Construction is fairly simple, but there's lots of it! Rudder, fin, stab and elevator are flat and easily built directly on the full-size plans. The horizontal stabilizer leading edge ■■ made up of two ⅛ x 2" balsa strips lami-

Intrepid aviator views one real, three fake cylinders (hiding fuel tank), and a real Fox 36RC. Landing gear prevents nose-overs.



Flying wires are functional and must be properly tuned by plucking. Note aileron servo location inside fake gas tank. Frightened pilot!

nated together. The rudder passage is removed after assembly. Upper and lower rudders are joined by a common ¼" sq. piece of spruce. Rather than sweep the leading edge eight degrees as on the original, we located the wing flat on top of the fuselage for simplicity, strength and easier mounting. Test flights later proved this to be a valid deviation from scale.

Begin construction of the fuselage by building the top framework directly on the full-size top-view drawing. For a flat building surface of the proper size, try to obtain a reject "second" blank door. It is light, rigid and cheap. The slight nose-down angle for downthrust must be taken into consideration when building the forward fuselage (raise former A ⅛" above the surface of the plans). The motor mount plate is later cut to shape, epoxied to the top of the forward fuselage and secured with wood screws. After the framework is completed, install all cross members as shown so warps won't develop. The top 1/16" sheeting is recommended for rigidity and alignment, but it will be cut away later in construction.

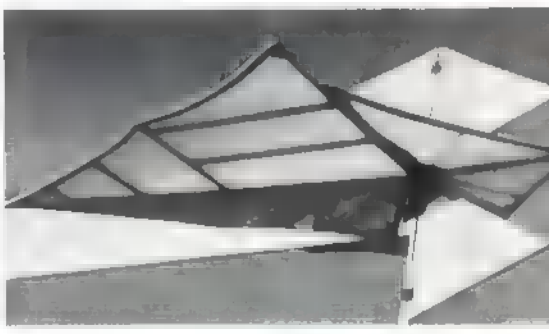
The bottom longeron is made from ¼" balsa from F-14 to F-7, where it is then spliced to the ¼" sq. spruce longeron. The two upper longerons are ¼ x ⅜" balsa. The formers for the fuselage are made from ⅛" balsa, then reinforced with ⅛ x ¼" strips. After fuselage assembly is completed, remove the centers as shown, leaving the guides for Nyrods. Install the Nyrods while the fuselage is still upside down on the plans and secure with epoxy at three or four places. If this long a run of Nyrod is secured only at the ends, it will bow in the middle when control surface forces.

The sides of the aft fuselage are sheeted with 1/32" balsa, then cut away as shown before silking. The sides of the forward fuselage are sheeted with 1/16" or 1/32" balsa and covered with 1/16" or 1/32" ply veneer back to F-7. Rub a stain into the grain and be sure to rub off any surface excess. Then cover with clear Top-Coat to give a glossy finish. Be sure to overlap the silk with Top-Coat at F-7 to prevent peeling back at this point due to the airstream and oil spray from the engine exhaust. The letters ANTOINETTE are cut from white regular MonoKote and ironed onto the Top-Coat.

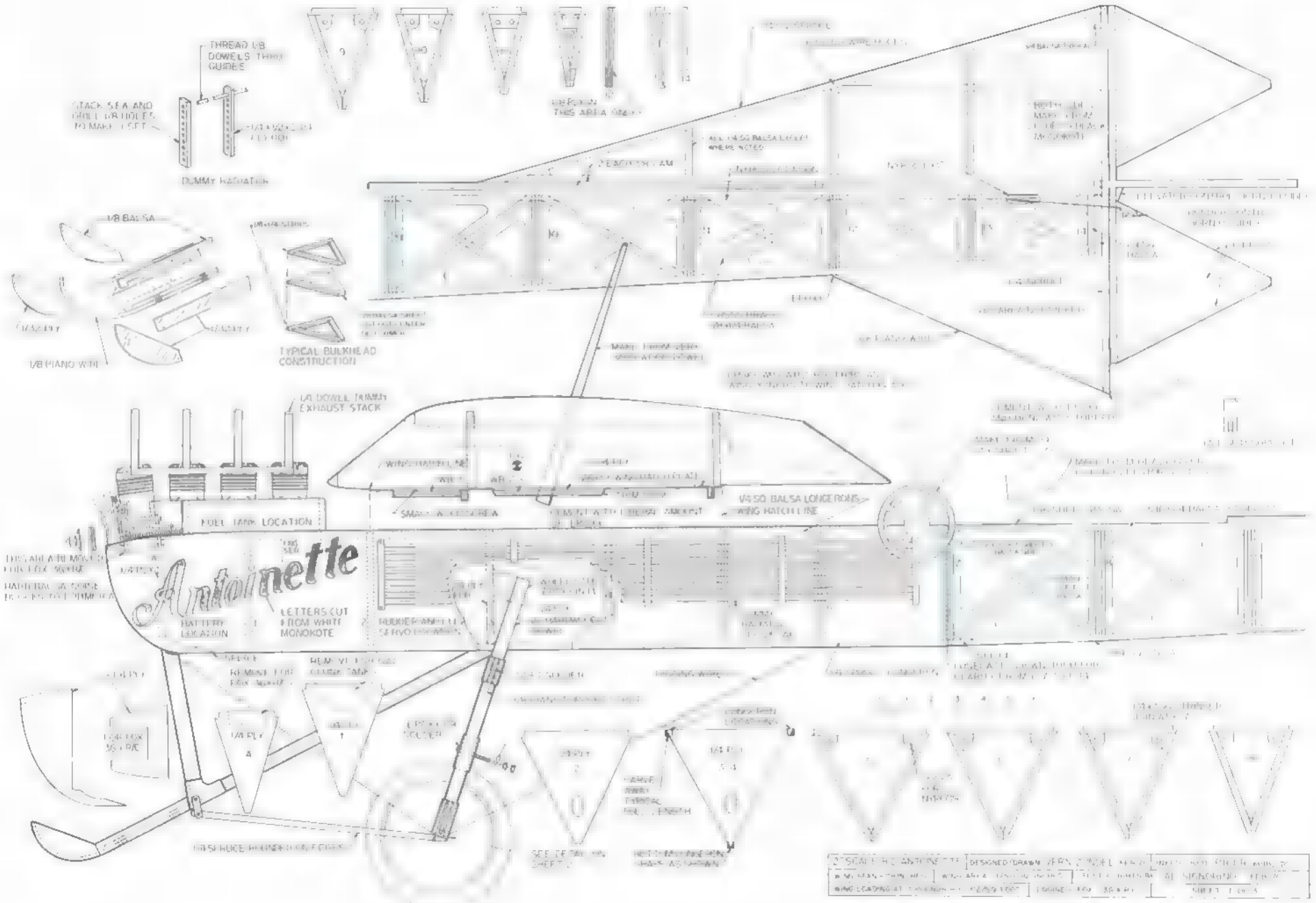
The dummy radiators are made up of ¼" ply formers drilled with ⅛" holes. Ten ⅛" dowel sticks 20" long are inserted, secured with glue, sanded flush on the ends and painted silver. The completed dummy radiators are held in place by four 4-40 screws mounted to the side of the fuselage.

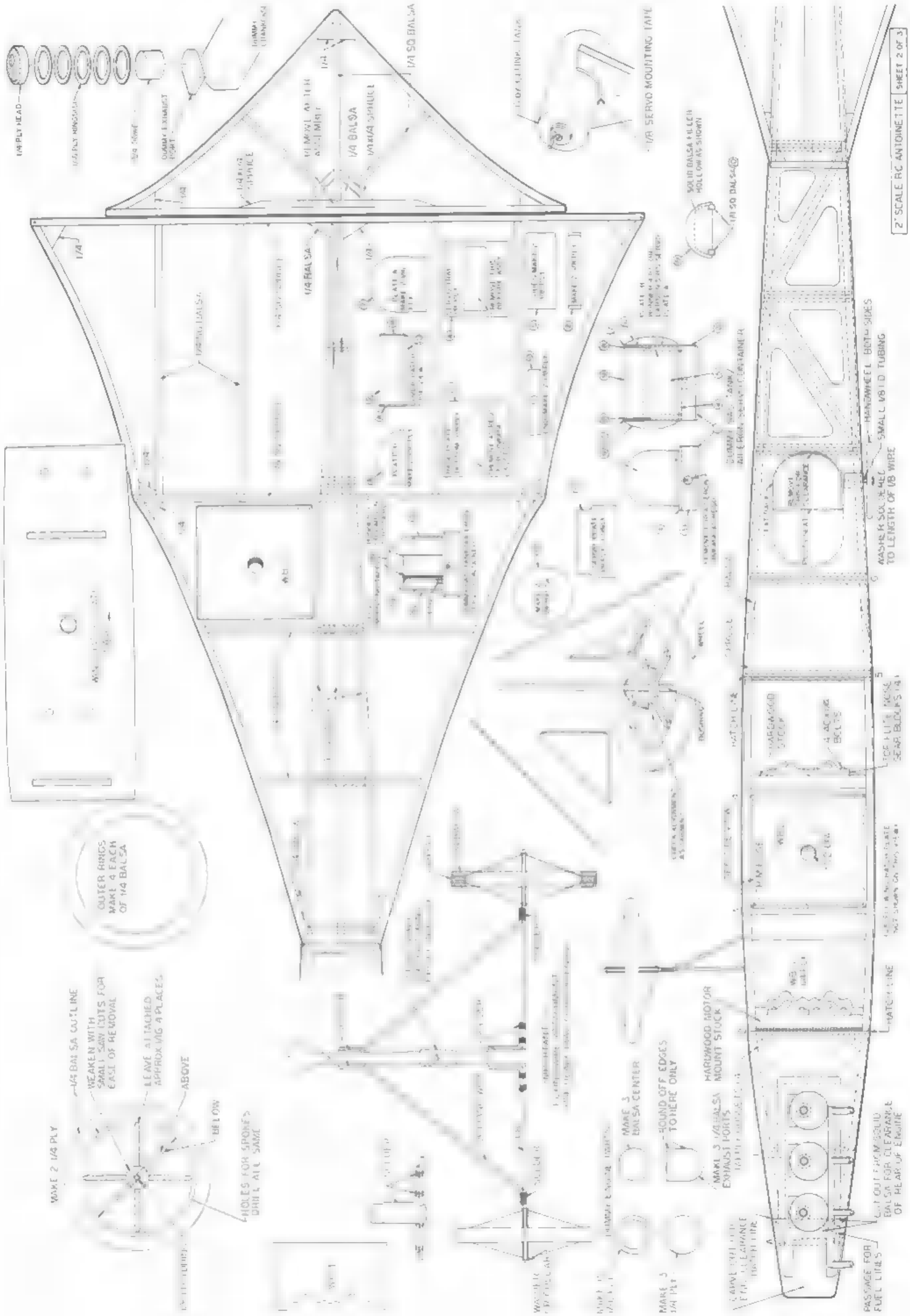
The dummy crankcase is made from a solid balsa block hollowed and fitted with ends. The exact shape is not important, but it should conceal the fuel tank. Three dummy cylinder heads were added to simulate the four-cylinder upright in-line DeHavilland Gipsy I engine used in the movie version of the Antoinette. (Some of the originals

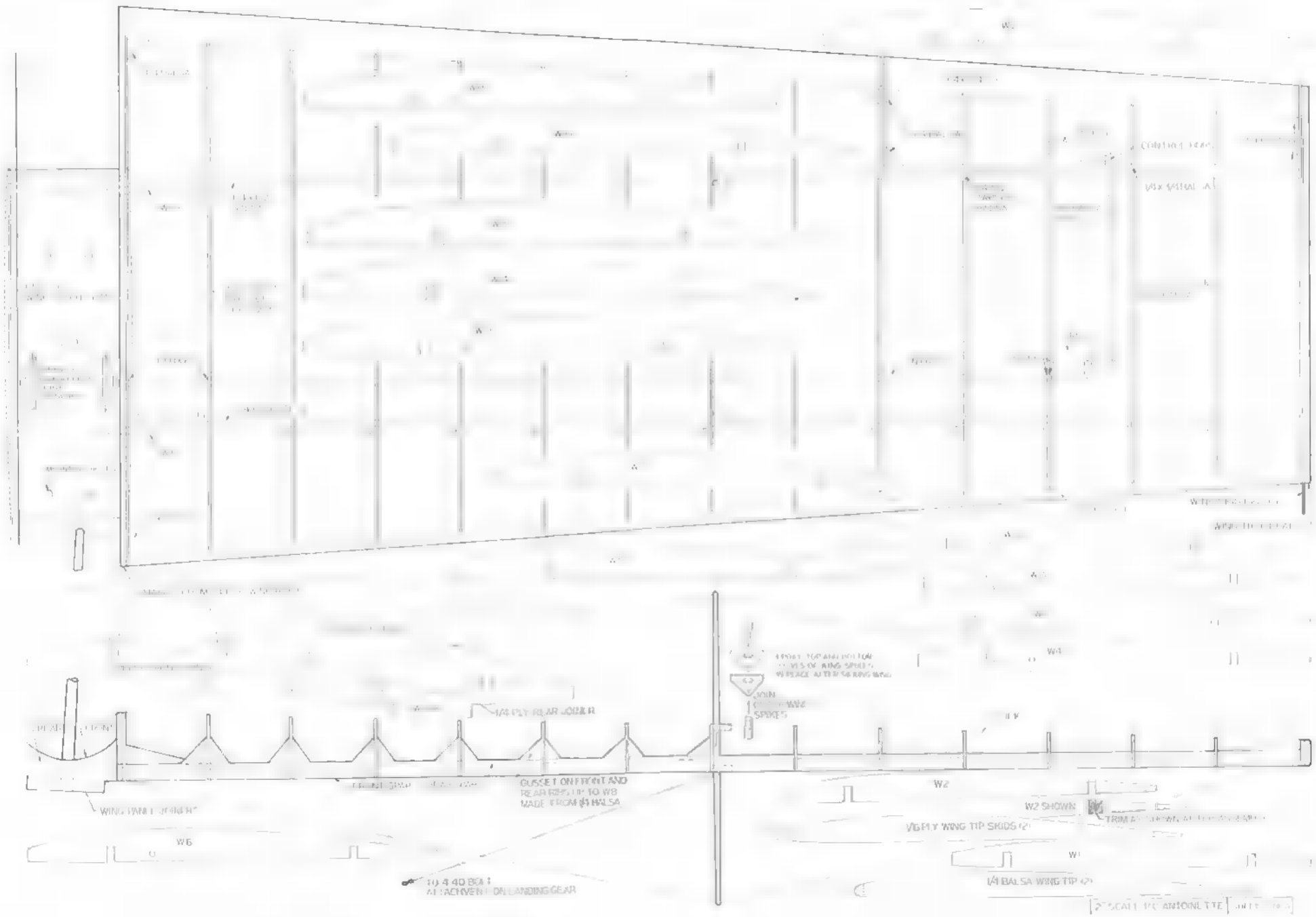
Continued on page 62



Takeoff must be directly into the wind. Acceleration is slow. Large stabilizer helps with excellent pitch stability and control.


THREAD 1/8 DOWELS THRU GUIDES
DUMMY RADIATOR
1/8 BALSA
1/8 PIANO WIRE
TYPICAL BULKHEAD CONSTRUCTION
1/4 DOWEL THRU EXHAUST STACK
FUEL TANK LOCATION
Antoinette
BATTERY LOCATION
LETTERS CUT FROM WHITE MONOKOTE
1/4 SQ. BALSA LONGERONS
WING HATCH LINE

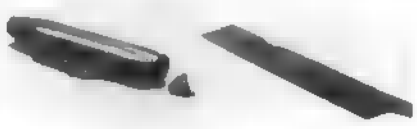

2' SCALE RC ANTOINETTE
SHEET 2 OF 3
1/4 SQ BALSA
1/4 BALSA
1/8 SERVO MOUNTING TAPE
SOLID BALSA HOLLOW AS SHOWN
HANDWHEEL BOTH SIDES
SMALL 1/8 I.D. TUBING
WASHER SOLDERED TO LENGTH OF 1/8 WIRE
MATCH LINE
HARDWOOD MOTOR MOUNT STOCK
OUTER RINGS MAKE 4 EACH OF 1/4 BALSA
1/4 BALSA OUTLINE
WEAKEN WITH SMALL SAW CUTS FOR EASE OF REMOVAL
LEAVE ATTACHED APPROX 1/16 4 PLACES
ABOVE
BELOW
MAKE 2 1/4 PLY
HOLES FOR SPOKES DRILL ALL SAME
MAKE 3 BALSA CENTER
ROUND OFF EDGES TO HERE ONLY
CUT OUT FROM SOLID BALSA FOR CLEARANCE OF HEAD OF ENGINE
PASSAGE FOR FUEL LINES


W2
W4
1/4 PLY REAR JOINER
GUSSET ON FRONT AND
REAR SIDE OF W8
MADE FROM 1/8 BALSA
W2
W2 SHOWN
W6
W1
1/4 BALSA WING TIP

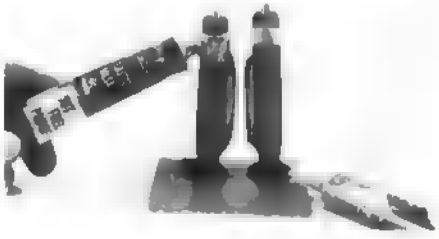
Jet with Props

Easy conversion to a test-bed aircraft for turbo-props is made from B-47 kit.

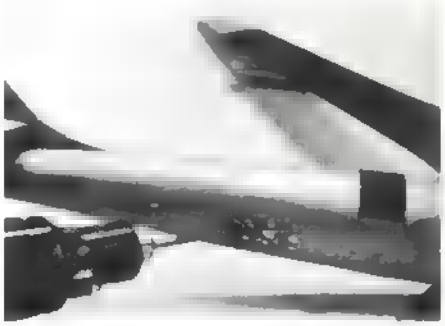
BEN MILLSPAUGH **PHOTOS BY THE AUTHOR**



A pair of external fuel tanks are cut and modified to make the prop engine nacelles.



Modeling clay provides convenient support for mounting small parts. Pods are lengthened.



JATO or RATO takeoff assist was readily used. Here Moto-Tool drills mounting holes.

THE Boeing Company added huge paddle-blade props to several of their B-47's and their series 51-2103 makes an outstanding model. It has the normal configuration of the B-47, but the inboard jet pods have been replaced by one long tube with four blades on the leading edge. This plane is perfect for the control line jet buff. It has the up-to-date shape, yet retains the props for side-mounted piston engines. However, this particular ship is aimed at the plastic modeler who wants to surprise all of the members of the local IPMS with a B-47 that pulls as well as pushes!

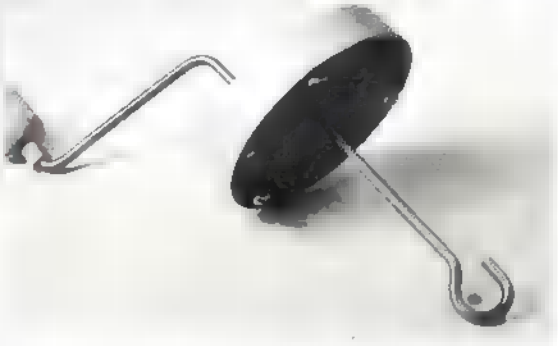
The reference for this particular B-47 is the No. 83 *Profile Publication*, which shows two B-47B's, serials 51-2046 and 51-2103. This adaptation was not an attempt to develop an improved bomber, rather it was intended to be a test bed for the Wright YT-49-W-1 turboprop engine. The outboard J-47's were retained. In July 1955, the first XB-47D took to the air, and the two four-bladed fans chewed the Kansas atmosphere with some 9710 shaft horsepower each.

For the modeler, the conversion is simple. A "ready-made" single tube pod is part of the AMT-Hasegawa B-47E. Actually, it is the fuel tank and is large enough to convert to the turboprop housing. By cutting the tips off of the external tanks and making a few additions, the lowly pods now do an important job.

The AMT B-47 is built according to instructions, but the inboard engines and external fuel tanks are not installed. The fuselage and wings may be worked beautifully using Green Stuff or AMT's Customizing Putty. A coat of Testors Silver will bring the plane to perfection. The modifications to the XB-

Continued on page 62

Completed turboprop test bed is distinctive with flat black wing and those out-of-place-looking propellers. Props can be made with few changes from a Thunderbolt or Corsair kit.



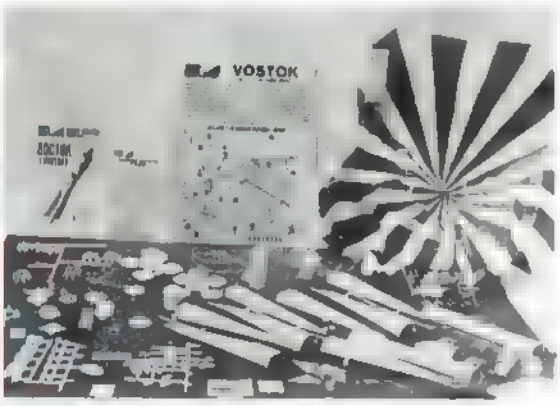
Marlowe Engineering/Rubber motor winder. Ready-made for the job, winder provides 16:1 turn ratio. All-metal solid construction. $2.95. **Marlowe Engineering,** 6850 Vineland Ave., North Hollywood, Calif. 91605

NEW PRODUCTS CHECK LIST

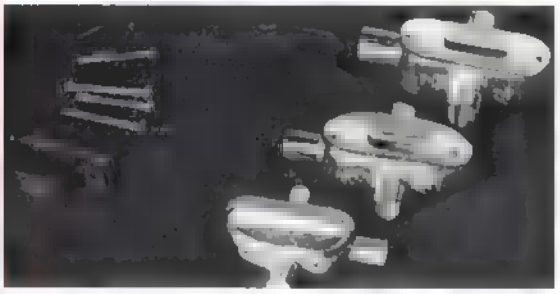
Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."

FRANK PIERCE

Photos by the author



Model Products Corporation/Vostok Rocket. For flight or display, kit can be assembled in either **Vostok** or **Sputnik** configuration. 1/100 scale, 15" high, model includes mylar parachute, all components except launcher and engines. Excellent plans and technical data on Russian rocket program included. $9. **Model Products Corp.,** 126 Groesbeck, Mt. Clemens, Mich. 48043



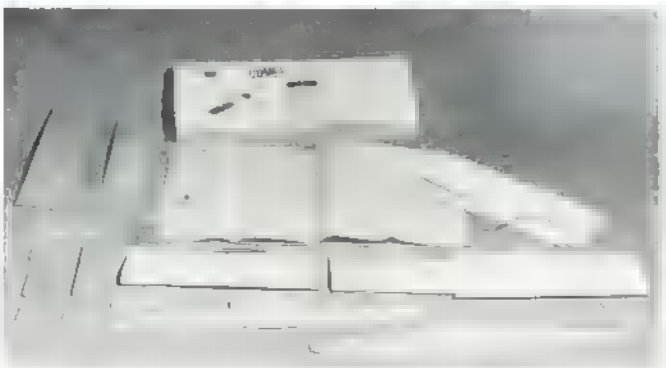
Tatone/Three exhaust manifolds. For 09 to 19 engines, $3.95; 29 to 40, $4.50; 45 to 65, $4.95. Using Tatone **Exhaust-Off** tail-pipe extensions, manifolds provide easy way to angle exhaust away from fuselage. All hardware including exhaust priming fitting. **Tatone Products,** 4719 Mission St., San Francisco, Calif. 94112

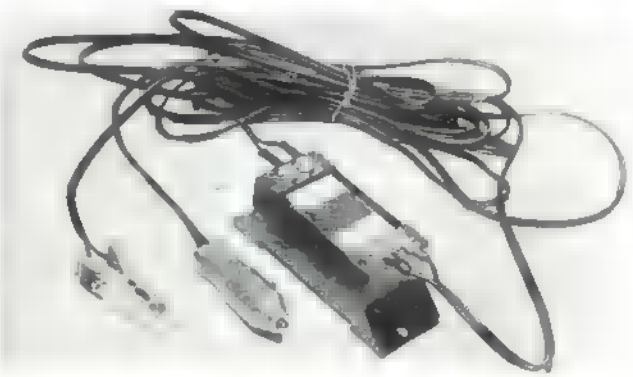
Air Races 1970 Annual/Aero Publishers. By aerowriter Reed Kinert, paperbound book provides close-up details of 1969 National Air Races. Info on planes, pilots, story behind the revival of air racing, details of record-breaking **Conquest I**, many drawings. $3.95. **Aero Publishers, Inc.,** 329 Aviation Rd., Fallbrook, Calif. 92028

Lancer Industries/Marvel Maker. For clean, easy cutting of polystyrene, unit uses thermal wire heating. Arbor allows accurate angle cuts. $12.95. Extra thermal wire, 59 cents. Instruction book, 50 cents. **Lancer Industries,** 1402 Norman Firestone Rd., Goleta, Calif. 93017

Kaiser Models/Li'l Comet. Pint-sized, low-wing sport RC model at bargain price. Precut balsa, 29" foam wing with stiff paper skin. Recommended for .010 to .020 power. $4.95. **Kaiser Models,** 1216 Juneau, Billings, Mont. 59102

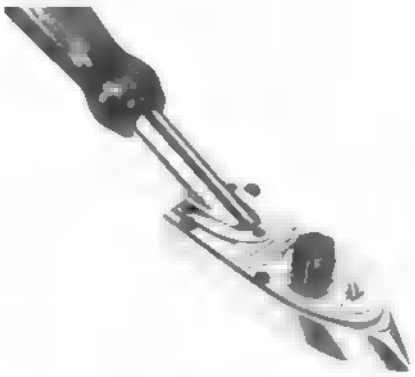
Tomco/Glo-plug initiator. Converts 6- or 12-volt sources to 1½ volts with less than .1 volt variation over 3 amp load. Cigar-lighter plug connector. Weight, 6 oz. Cost, either 6- or 12-volt model, $14.95. **Tomco,** Box 4403, Little Rock, Ark. 72204



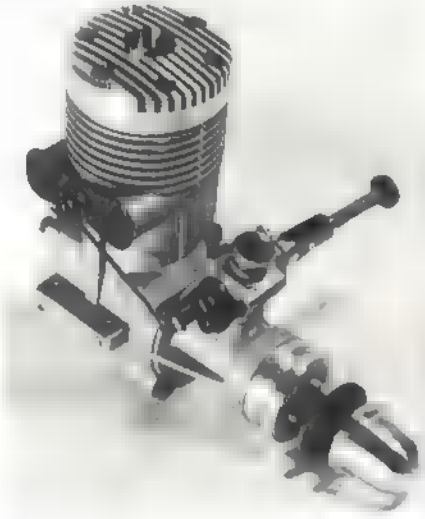


Shore Hobby Supply/All-plastic Parasol RC. Nearly scale, new kit closely follows design of **Champion Aircraft Co. Pro.** Plastic-covered wings, removable cowl, fully-assembled fuselage, one-piece welded cabane struts, most hardware. 48" span, uses 15 to 29 engine. Typical weight with three servos and 19 engine, $2^{3}/_{4}$ lb. $34.95. **Shore Hobby Supply**, 62 White St., Red Bank, N. J. 07701

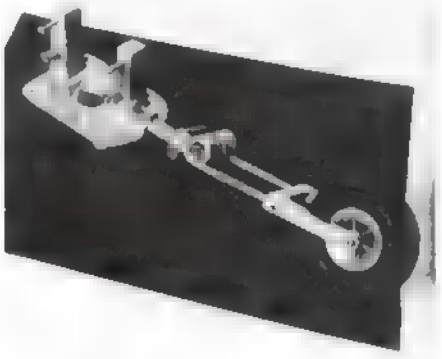
Kayeff/The Viking Ship. A Billings Boat quality product imported from Denmark, this small merchant vessel of the Viking period features planked hardwood hull, 26" long by $6^{1}/_{2}$" wide. Reconstructed original found in [illegible] is in Copenhagen Museum. Kit $16.00. Catalogue $1.00. **Kayeff, Inc.**, 511 Campesina Rd., Arcadia, Calif. 91006



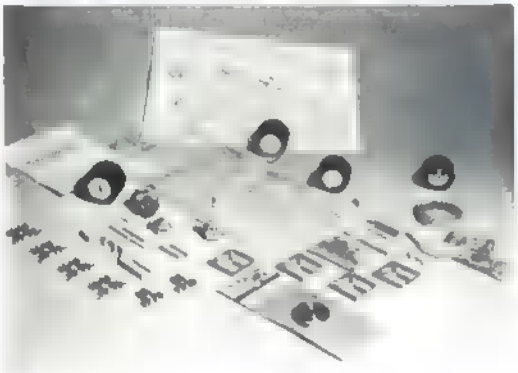
Top Flite Models/MonoKote Sealing Iron. Weighing only [illegible] oz., iron is designed to catch hard-to-reach places like fillets, landing gear, etc. Teflon coating means [illegible] sticking or scratching. Also useful for other heat-sealing applications in the 250-400 degree range. Thermostatically controlled. $9.95. **Top Flite Models, Inc.**, 2635 [illegible] Wabash Ave., Chicago, Ill. 60616



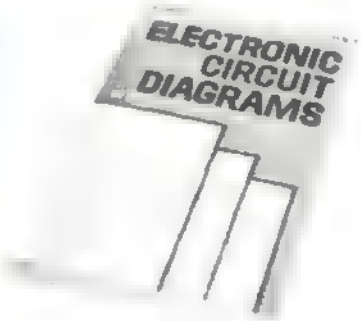
World Engines/Max OS 60. Series H, [illegible] piston ring. $42.95. **World Engines, Inc.**, 8960 Rossash Ave., Cincinnati, Ohio 45236



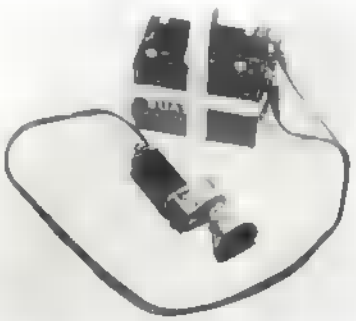
Tatone/Gear and engine mount. For 60 through 74-sized brutes, cast aluminum mount is also available for most other standard engine sizes. Less wheel. For more info, write **Tatone Products**, 4719 Mission St., San Francisco, Calif. 94112



Dynamic Models/RC racing car kit. $^{1}/_{8}$-scale, all-metal chassis components, and torque converter transmission, car is designed for RC operation with .15 or larger engines. Heavy-duty mag-type wheels and formed butyrate-plastic body. $127.50 not including engine, RC gear. OK for beginners. **Dynamic Models**, 13309 Saticoy St., North Hollywood, Calif. 91605



Tab Books/New Electronics Theory book. A must for RC'ers still short on electronics, book takes beginner through all common phases of electronics with accent [illegible] how to read schematics. Transistors, Zener diodes, PC boards, test gear, etc. Plus complete glossary and index. Paperbound. No. 10. $3.95. **Tab Books**, Blue Ridge Summit, Pa. 17214



Patchogue Hobbies/Electric starter motor. Unit uses 12-volt motor with $4^{1}/_{2}$:1 gear ratio, can crank 60 engine at 3400 rpm. Molded rubber insert fitted to cast aluminum cone engages prop spinner. "On" button built into handle. **Jet Start** designed specifically for model engine applications. **Patchogue Hobbies**, 240 Medford Ave., Patchogue, N. Y. 11772

National Air and Space Museum

GREAT LAKES TRAINER

One of the most popular and aerobatic aircraft in history was this photogenic biplane.

DON BERLINER

A Great Lakes Trainer is an ore barge with dual controls and training wheels.

It is also a wonderful old biplane that has made more of a name for itself in its reincarnation as an aerobatic mount and as a vintage treasure than it ever did in its first life as a training machine.

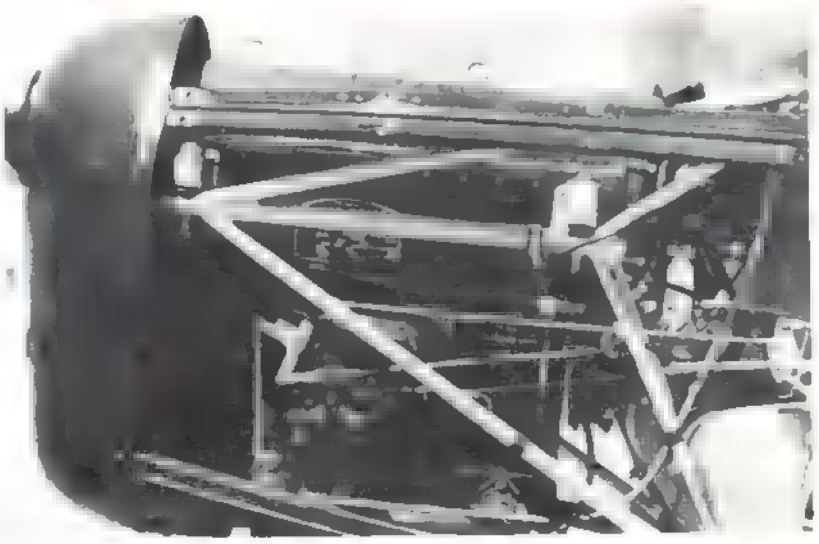
While hundreds of thousands have gaped in admiration at the splendid aerobatics of Hal Krier in his red-and-white Great Lakes with its roaring 185-hp Warner radial engine, a relative few have ever seen the unmodified "Lakes," which is quite a different airplane. It was graceful, it was agile and it was underpowered, at least by today's standards.

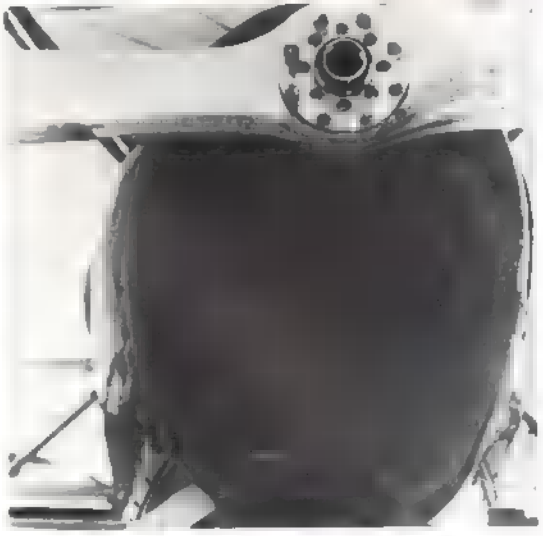
But when the Great Lakes Aircraft Corp., Cleveland, Ohio, introduced its Model 2T-1 in 1929, the goal was pilot training, not aerobatics. The boom in aviation interest following Lindbergh's 1927 New York-to-Paris flight was on everyone's mind, and learning to fly was becoming popular. Schools were popping up all over the country and they needed good training planes.

And they also needed money, which was in extremely short supply once the Great Depression hit, and learning to fly airplanes suddenly became a luxury most people could do without, as they scraped for a living. In 1932, after producing just over 200 Trainers, the Great Lakes Aircraft Corp. went out of business. It was not until many years had passed that its airplane achieved the level of fame for which its developers had hoped.

The prototype Great Lakes Trainer, first shown to the public at the March, 1929, All-American Aircraft Show in Detroit, Mich., was powered by a 95-hp American Cirrus Mark III, an upright, four-cylinder, in-line, air-cooled engine built by American Cirrus Engines, Inc., under license from the British developer. The airplane differed from the better-known later versions mainly in having a straight top wing rather than the more familiar swept wing.

Tests performed on an early 2T-1 by the National Advisory Committee on Aeronautics — predecessor of NASA — showed top speed of 106 mph; sea level rate of climb of 545 ft./min.; landing speed of 48 mph.





Opposite: Although Hal Krier's 185 hp "Lakes" is known to airshow crowds, the Cirrus jobs first flew in 1929. Above: Menasco mounting, one of many. Scale buffs have plenty of intake holes to carve. Inverted engine puts thrust high for a good trim.

After four 2T-1s were built, it became apparent that, by placing the top wing far forward and thus enabling a passenger to enter the front seat with a minimum of difficulty, the airplane had been made tail heavy. Moving the top wing back would have made entry into the front cockpit awkward, so the center section of the top wing was kept in place and the outer panels swept back 9 degrees into their now familiar form. This was the 2T-1A of 1929. Part way through the production run, the vertical tail was considerably enlarged, and those subsequently produced were known among enthusiasts as the "Big Tail" Great Lakes.

In 1930, a new version of the Cirrus engine — the inverted, in-line Hi-Drive — was introduced on the assembly line, and resulted in the new profile of the Model 2T-1E, with its higher-mounted propeller. Some of the 2T-1Es, last of the production versions, were powered by the American Cirrus company's 100-hp Ensign.

This was the relatively simple overall pattern of the Great Lakes Trainer, but modifications played an unusually important role in the history of the type, even before the post-World War II flurry of amateur redesigning completely muddied the picture. A few of the early trainers were fitted with the Menasco B4 "Pirate," an inverted, in-line engine of 95 hp; these were never given a full Approved Type Certificate by the CAA and were manufactured under a special license. Others carried Kinner engines and were known as the Model 2T-1K.

The one-and-only Model 2T-2 Great Lakes was a racing version of the 2T-1A built for and raced by Charlie Meyers, the firm's

Continued on page 84

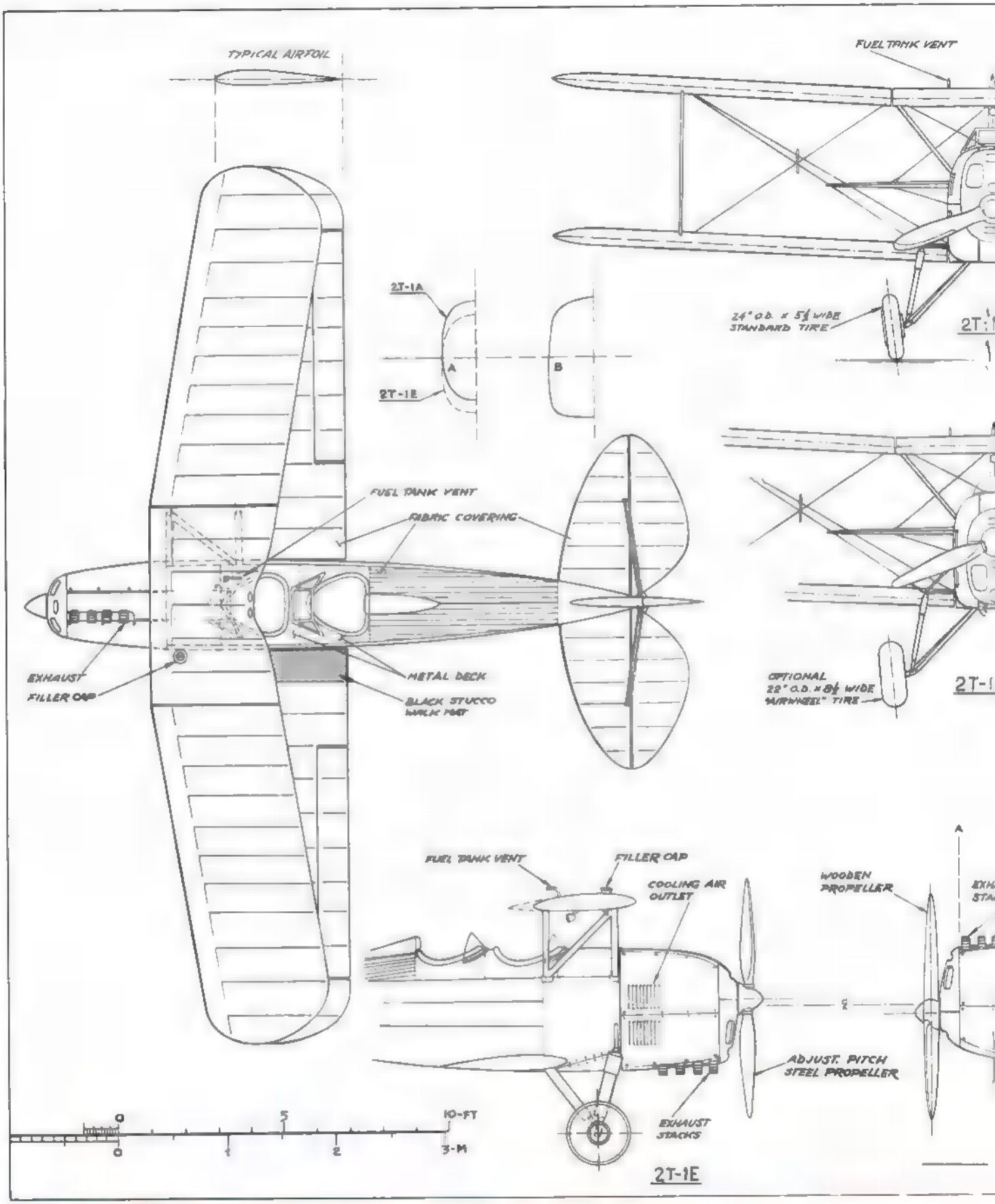
Specifications

Wingspan — 26' 8"
Length — 20' 4"
Wing area — 187.5 sq. ft.
Empty weight
2T-1A — 910 lb.
2T-1E — 1,016 lb.
Height — 8' 4½"
Airfoil — NACA M-12

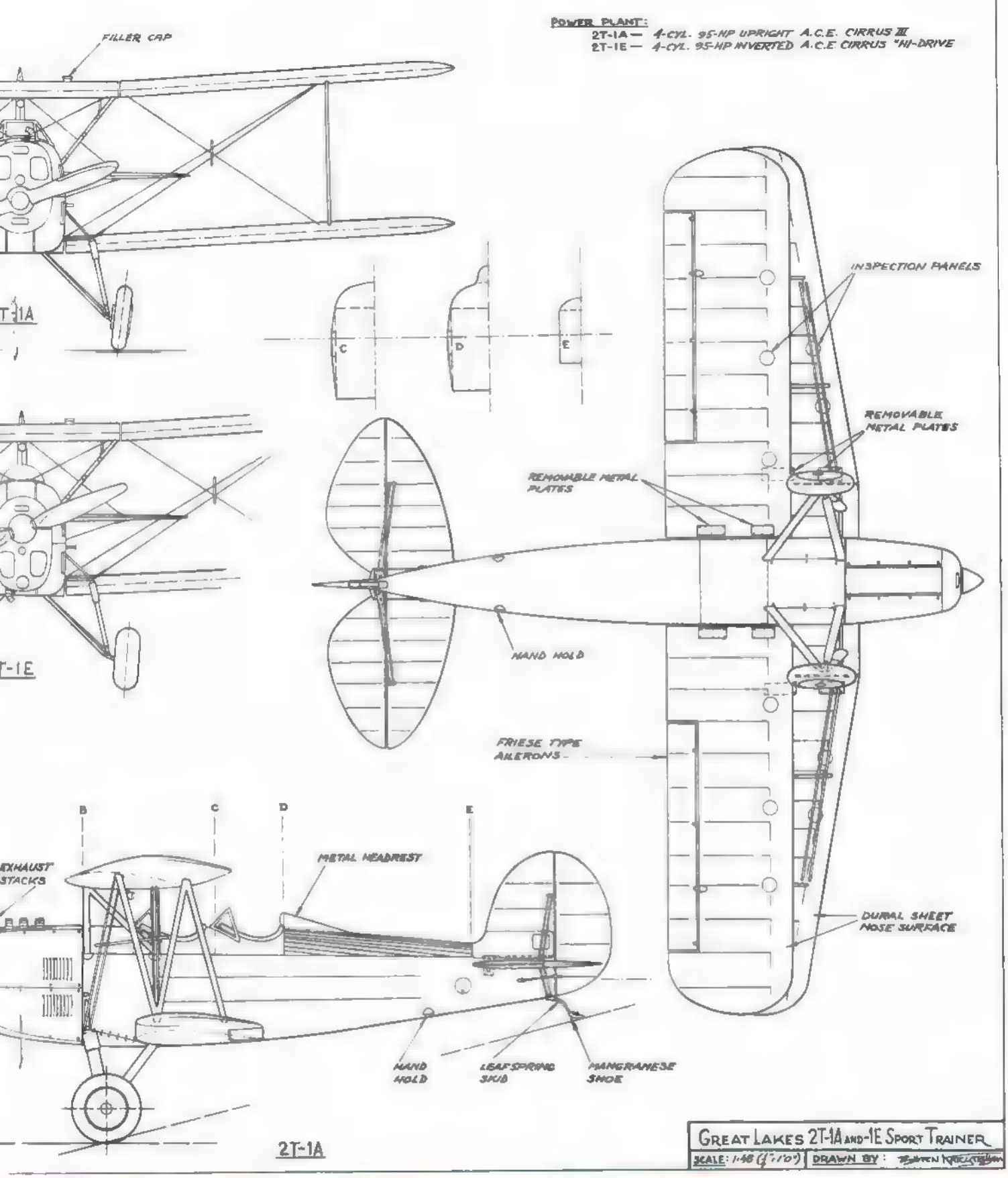
Construction

Fuselage — chrome moly steel tubing
Wings — spruce spars, aluminum alloy ribs
Tail — aluminum alloy frame
Landing gear — split axle with spring oleo shock absorbers
Fuel tank — single 26-gallon tank in center section of upper wing

Some 200 of the fighter-like light planes were made by 1932 when the Depression ended production. Genuine appreciation came later.



Great Lakes 2T-1A and 1E Trainer



Designed as trainer in 1929, the original 95-hp Cirrus-engined biplane had dual controls, hefty trainer wheels. (The Lindbergh flight had created an urge to fly and air schools popped up throughout the country.) At the time, it did only 106 mph, climbed 545 ft. per min. About 50 higher-powered antiques remain.

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ACE R/C

SERVES YOU FOR ANY R/C NEED

SERVING YOU SINCE [redacted]

[redacted] R/C [redacted]:

The picture above introduces [redacted] Wunsch, [redacted]ates H [redacted] W Enterprises of Box 972, Regina, Sask., Canada [redacted] the batch of Commander Rudder-Only Pulse Transmitters being [redacted]

Bill and [redacted] W Enterprises have [redacted] licensed to manufacture [redacted] Commander Rudder-Only packages for distribution [redacted] Canada. The popularity of pulse proportional is gaining throughout the world. [redacted] wish for [redacted] very best [redacted] his ventures [redacted] trying to make them available [redacted] Canadian modelers [redacted] more reasonable cost by assembling them there.

Incidentally, [redacted] Commander transmitters an[redacted] are all [redacted] (Department of Communication) approved for [redacted] in Canada. (This [redacted] formerly DOT, [redacted] has [redacted] renamed.)

Canadian customers [redacted] dealers are urged to get [redacted] contact with [redacted] on the Ace Commander R/O packages

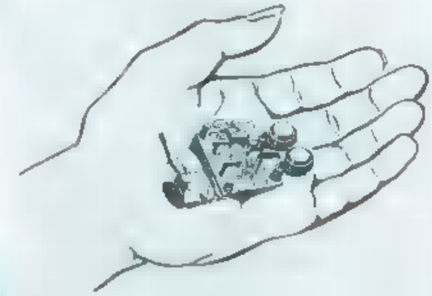
Our Rudder-Only [redacted] units [redacted] still number one sellers. Modelers [redacted] finding that [redacted] Pulse units present their [redacted] choice because: They do [redacted] use in the smaller airplanes–the Baby weighs in at 2.5 [redacted] and [redacted] Stomper [redacted] more than adequate to handle planes up [redacted] .15. You have complete and [redacted] reliability that has [redacted] proven by thousands of satisfied users throughout [redacted] world

The big [redacted] also is that now the Commander R/O [redacted] packages contain ALL batteries and represents [redacted] most economical buy [redacted] the market today. [redacted] you do any comparison shopping between the Pulse R/O Commanders and any other system, remember [redacted] with [redacted] Commander units you get [redacted] only [redacted] hefty M-1603 transmitter battery, but also [redacted] nickel cadmium battery pack for [redacted] airborne unit. And nickel cadmiums [redacted] airborne units are still your best [redacted] most dependable choice for continued reliability. They [redacted] only recharging; no replacement.

Charging equipment for the Commander R/O series is available separately, simply because many who buy [redacted] packages have [redacted] charger available which will adequately [redacted] their needs.

The small plane plans by Owen Kampen and Romey Bukolt [redacted] very popular. This type of aircraft should not [redacted] downgraded from [redacted] standpoint that it is only a calm weather performer. One Iowa flyer reports [redacted] is flying a small plane in winds [redacted] to and over 25 miles an hour consistently; and that he [redacted] flying his rudder-only small ship when other jobs are grounded. It's [redacted] a matter of trimming, [redacted] you can have as much penetration [redacted] needed. [redacted] the small ships, when you [redacted] come in hard, you bounce–but [redacted] bounce easier!

On the small ships we hope to have [redacted] rather exciting [redacted] very soon. For [redacted] we can only give you [redacted] teaser on this, but there [redacted] the distinct possibility that foam wings for the small [redacted] to 36 inch jobs will be available soon.



A HANDFUL FOR YOUR PLEASURE

For the modeler who has been looking for superhet systems which [redacted] ultra light to go into the mini [redacted] micro series of airplanes!

Weight of the receiver and the small Bentert is less than 1 ounce, and depending on your battery choice you can keep the weight well under 1¼ [redacted].

This [redacted] excellent for the mini and micro plane enthusiasts, and also is finding increasing use [redacted] boost glide phase of model rocketry.

We are listing below all of the components that [redacted] required for an ultra light weight installation, and you can select your handful of pleas[redacted] to fit your application.

The receiver is compatible with our R/O Pulse Commander Transmitter, and this may be had separately or you can add this handful of pleas[redacted] airborne package to your present R/O system.

COMMANDER MICRO GEM RECEIVER

The Micro Gem [redacted] available in two models. This is a proven design of which thousands are in satisfactory [redacted] throughout the world. The receiver measures 1 1/16 x 1 1/2 x 1/2 inches. Weight [redacted] the bare receiver less hook-up wires is .5 ounces. With light weight hook-up wire is .7 ounces. Operation is on 2.4 volts with phenomenal range; may be used with 3 volts. [redacted] two models [redacted] the DE, which has [redacted] double [redacted] output to feed into the Adams style actuator, and the SEB, which is designed for the Bentert type of actuator only.

No. 12K2—Commander DE Gem Rx $31.50
No. 12K3—Commander SEB Gem Rx 30.75
(For the Bentert only)
(Available [redacted] 27 MHz except 27.255.)

COMMANDER R/O TRANSMITTER

The foregoing receivers are compatible with our Commander Pulse Transmitters. Requires [redacted] volt battery of the M1603 type.

No. 11K1—Commander R/O Tx $42.50
(Available all 27 MHz except 27.255.)

BENTERT ACTUATORS

These are single coil units with magnetic return. Small model weighs 7.5 grams and draws 50 ma at 3 volts. Large model weighs 15 grams and draws [redacted] ma at 3 volts.

No. 14K1—Small Bentert Actuator $9.95
No. 14K2—Large Bentert Actuator 9.95

MALLORY MS76 SILVER OXIDE

Non-rechargeable 1 1/2V. Good for 60-90 minutes with Gem and Bentert. Only 2.2 grams; .46 x .21".
No. 38K32—MS76 Silver Oxide cell, ea. $.50

50 MA BUTTON NICAD

Rechargeable 1.25V. Only [redacted] grams; .606 x .230". Solder tabs.
No. 38L4—Nicad B50T Button/tabs, ea. $1.39

100 [redacted] BUTTON NICAD

Rechargeable 1.25V. Only 8.5 grams; 63/64 [redacted] 1/4". Solder tabs.
No. 38K29—Nicad B100T/tabs, ea. $1.70

2.4V/B100T PACK

Two of above 100 ma cells stacked for 2.4V pack with tabs. Measure 63/64 x 1/2".
No. 38K9—2.4V/B100T Pack $3.65

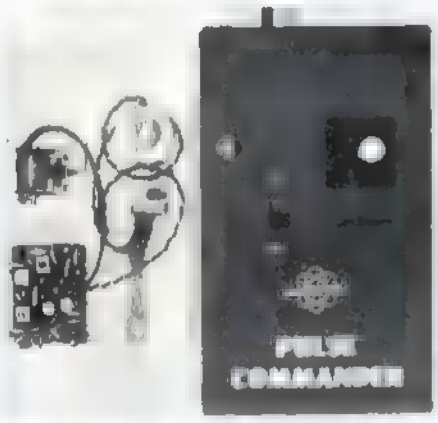
PULSE .. Best Choice for You!

FULLY PROPORTIONAL–BUILT-IN RAND STICK WITH TRIM; ALL BATTERIES SUPPLIED, NICKEL CAD PAK FOR AIRBORNE UNIT; THOUSANDS IN USE

RUDDER ONLY PULSE IS:

- FULLY PROPORTIONAL!
- LIGHTEST--2.5 oz. for Baby
- LOWEST COST--Packages include ALL batteries; Airborne cost pack uses nickel cads for repeatability and dependability; only recharging.
- SIMPLEST--only moving part, noise free
- VERSATILE--arrange to suit your particular installation. You can up in size down in size. You can even go micro and mini, and not obsolete your transmitter or basic receiver. Simple changes of battery and actuator allow a variety of installations. Motor control be easily added to larger units.
- EASY to install
- GREAT for Beginners--CHALLENGING to the pros.
- FUN!

WITH ALL BATTERIES!



COMMANDER R/O PULSE PACKAGES

Ideal for Beginners and Sport Flyers

Now available in four sizes!

The Commander R/O packages contain Commander DE 2.4 superhet receiver, Commander Pulse Transmitter, Adams actuator size of your choice, and nickel cads, wired with on-off switch. AND each package saves you $10.00 over buying components separately.

The R/O Packages are available in 4 sizes for most sporting needs from the smallest to the larger aircraft--or boats. Ready for installation, completely wired and tested.

The Baby is for .010 to .020 jobs. Has two 225 ma Nickel Cadmiums and the regular Baby Adams, Airborne weight is 2.5

The Twin Baby is for hot .010 to .020 jobs. As above, except uses Twin Baby actuator. Airborne weight is 2.9 ounces.

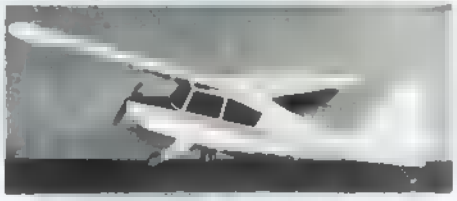
The Standard uses the Single Adams for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The Stomper the Twin Adams actuator for up to .15, or can be boosted for with .19. Airborne weight is 4.9 oz.

(Charging equipment extra)

No. 10G15—Commander R/O Baby pkg. $69.95
No. 10G15T—Commander R/O Twin Baby 72.95
No. 10G16—Commander R/O Standard 71.95
No. 10G17—Commander R/O Stomper 74.95
Available all 27 MHz, except 27.255. Specify.

Thousands of Satisfied Users



PLANES JUST FOR FUN!

Easy to build, easy to maintain, and low in cost and upkeep, this new breed is fine for beginners. more of the big plane fliers are joining fun they can keep their hands in--or teach their youngsters.

To help Fun Plane along, Ace is offering two plans now. More later. These are full size with enough details to allow almost anyone with just a bit of experience to build and fly. They are designed specifically for radio gear of no more than 3 ounces--and here where the Commander R/O Baby Twin pack comes in. Just right proven dependability!

Rudder-Only does allow you much more than simple steering--you can do loops, spirals, Split S, and many more. You can gain or lose altitude simply by widening or tightening your turn.

DICK'S DREAM

This 34" job is designed by Owen Kampen. Named for the late Dick Adams who developed the magnetic actuators. Essentially this is a down Whiz Kid, but has a few features especially for this size plane. Easy construction. Plans are full size.

No. 13K29—Dick's Dream Plans $1.00

CITABRIA

This scale is a design by Roman Bukolt. Has 34" and features simple slab construction. Another catcher at the Toledo Conference. Full size.

No. 13K30—Citabria Plans $1.00

COMMANDER GALLOPING GHOST

Rudder, Elevator, Motor–One Actuator

No. 10G18—Commander Ghost $109.00

COMMANDER FAST PULSE PACK

Rudder, Elevator, Motor–Two Actuators

No. 10G19—Commander FP $139.00

All 27 mHZ frequencies, except 27.225.

COMMANDER CHARGERS

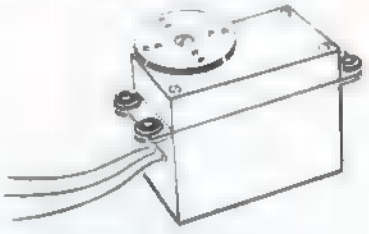
Now chargers of four different kinds required by the Commander series of airborne units. Baby--25 ma 2.4 v; S--Standard and Stomper--50 ma at 2.4 v; GG--60 ma at 3.6 v; FP--100 ma at 3.6 v. Assembled.

No. 34K4—Commander Baby Charger $4.95
No. 34K5—Commander S* Charger 4.95
No. 34K6—Commander GG Charger 4.95
No. 34K7—Commander FP Charger 4.95
* Standard or Stomper

VARI CHARGER

If you want a more universal type of charger for your nickel cadmium battery supplies the Vari-Charger has much to recommend it. It features a high quality transformer and will charge up 5 or more cells in series with up to 150 milliamp current. Charging rate is adjustable from 20 to 150 mils, with easy-to-use chart.

No. 34K21—Ace Vari Charger Assembled 9.95
No. 34K22—Ace Vari Charger Kit 7.95



KEN'S PULSE THROTTLE CONTROL

Manufactured by Ken's R/C this new unit uses a motor driven servo. Designed for high, medium and low throttle on Rudder Only Pulse systems, the control requires only slight modification to Transmitter. Easy to hook up to airborne R/O Packs--just three wires. Uses same battery supply. Designed specifically for the Commander R/O series of Standard or Stomper size.

Housed in a WE S4 case. Completely wired and tested. Weight only 1¾ oz.

Transmitter modification is simple, since Throttle Control requires a fast pulse momentarily. Kit is available or complete custom factory conversion of your transmitter.

No. 14K69—Ken's R/O Throttle Control $24.95

TRANSMITTER CONVERSION

Kit to allow you to convert your Commander R/O Transmitter for above motor control. Easy to follow instructions.

No. 14K70—Tx FP Throttle Control Kit $3.00
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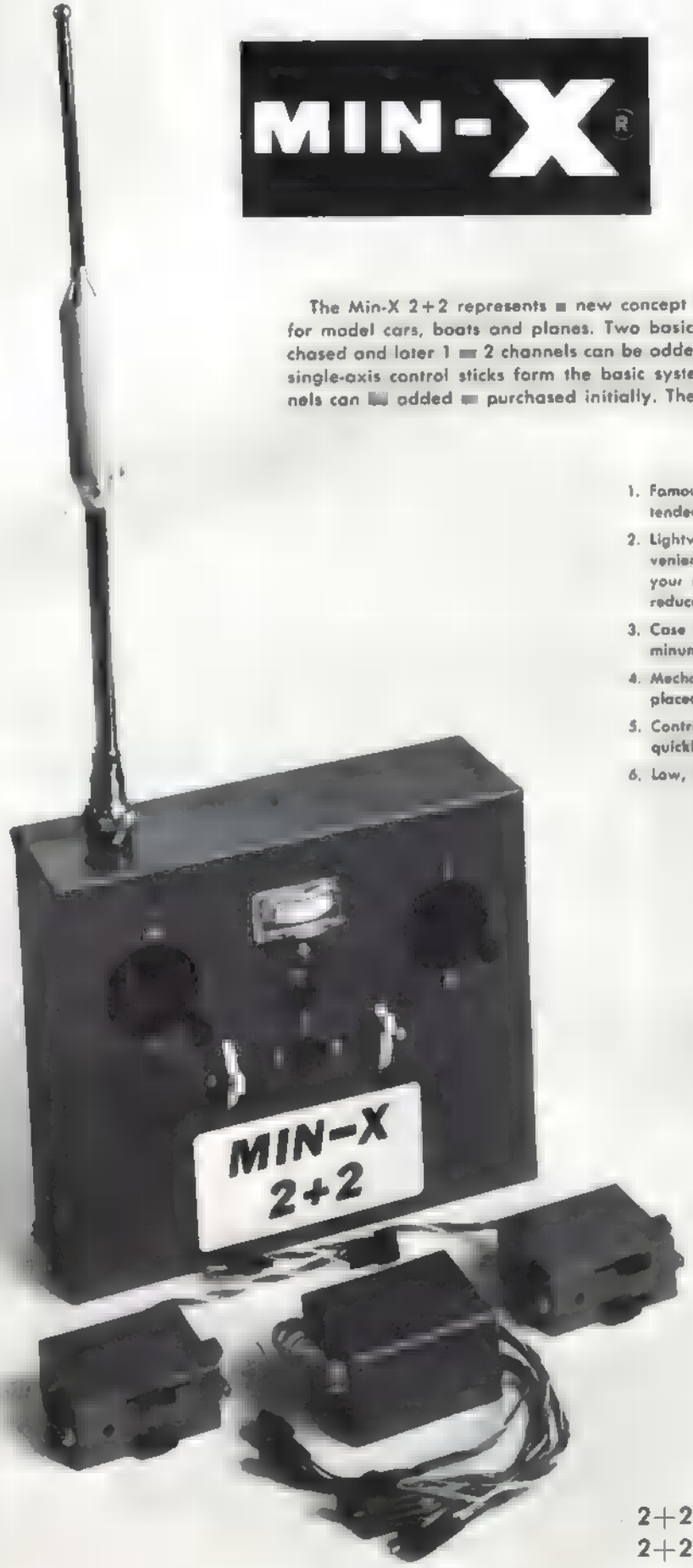

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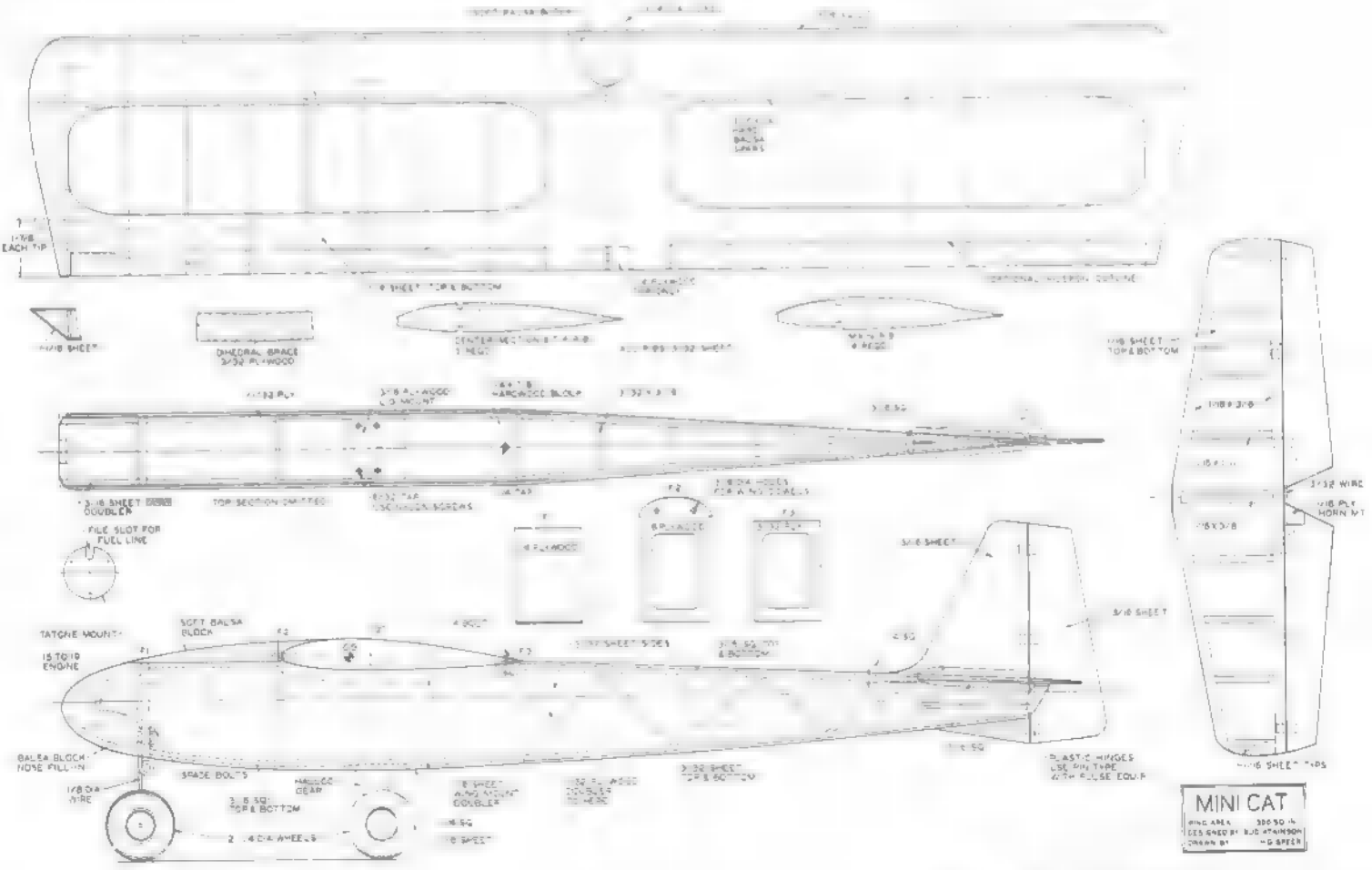
The idea of a small Aristo-Cat had been in the back of my mind for some years, but it did not materialize until I had to do field testing of the new Ace Pulse Commander. None of the standard small birds was quite what was needed, and the Cat came to mind again. The Aristo-Cat was too large for testing purposes but, once the original plans were in hand, the creation of the Mini Cat did not take long.

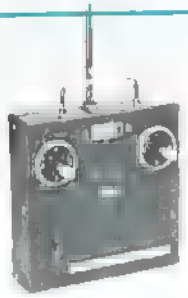
The objectives for the Mini Cat were the same as those for the Aristo-Cat — basically simple to build, rugged, and above all, a ship that flies well. The Mini is this, and more. Made small to handle the pulse system, it is still large enough to take full-house propo gear. The Mini Cat takes a 15 to 20 engine, using a Tatone or Midwest T mount. Tests were made with a Webra 20. The ship could be called a "scat cat!" The Webra really wheels it around! A 15 is milder and would be better for the novice. The roll rate with rudder is something to see! Just as with the big Cat, consecutive rolls appear like aileron rolls on most ships. For a full house set-up, aileron outlines are shown. They may be added easily after the wing has been flown as a rudder ship.

Flown with the Ace Pulse Commander and also an EK XL-3, the Mini Cat showed excellent flight characteristics with both. When using a pulse system, loosely hinged surfaces, like the center-pin hinges, are

Continued on page 89



FULL SIZE PLANS AVAILABLE — SEE PAGE 70



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S-4B Servo	30.00	22.98	18.98
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SEPTEMBER 1970

MODEL AVIATION

Official magazine

A.M.A. NEWS

Academy of Model Aeronautics • 806 Fifteenth Street N.W. Washington DC 20005

First AMA Scholarships Announced

The AMA Scholarship Committee has approved the awarding of two AMA scholarships for 1970 — one each to the top boy and girl applicants. To be honored for their meritorious records in a special presentation during the 1970 Nats Sunday Model Air Show are **Charles W. Reed**, 19, from Raytown, Mo., and **Miss Susan M. Weisenbach**, 18, Cleveland, Ohio.

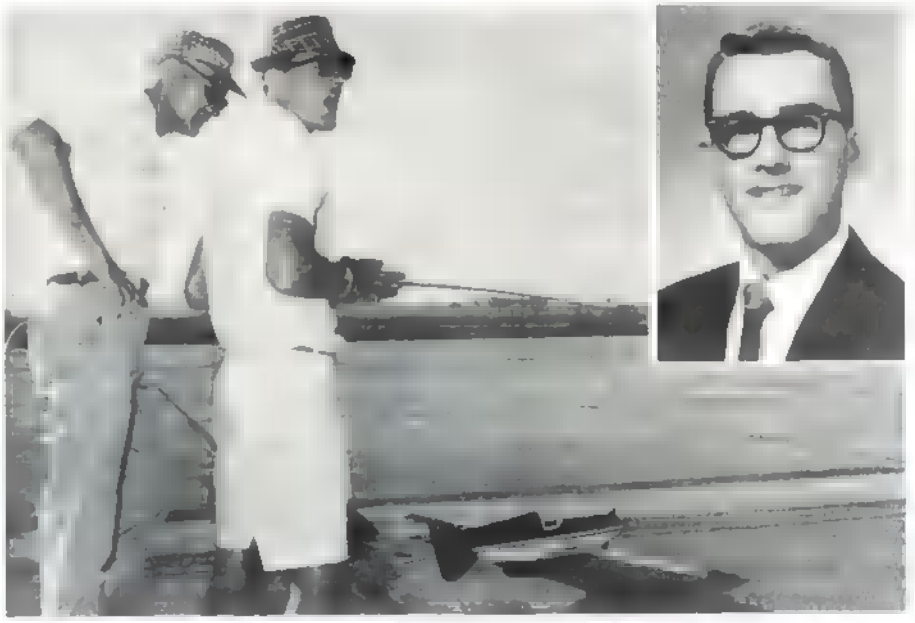
The awarding of two scholarships instead of the one originally contemplated was due to the outstanding scholastic and modeling achievements of the winners. The dual awards will not diminish the proceeds to the winners even though initial planning was based on awarding only a single scholarship amounting to $1,000. The two winners will each receive $1,000, to be used toward furthering education in college. An allocation of 10 cents from the dues of each adult AMA member, plus voluntary contributions to the AMA Scholarship Fund, produced $3,500 as of January 1 of this year, which enables the awards to be given this year and still leave enough money to assure continuation of the program in 1971.

The scholarships presented to Charles and Susan are the first ever to be awarded by the AMA, but hopefully the program will be continued and expanded for many years to come. The program was first conceived several years ago when **Matty Sullivan** (AMA Life Member, former Nats Contest Director, manufacturer of Pylon Brand Products) made a major contribution for this particular purpose, following which the Executive Council authorized the apportionment of AMA dues and the solicitation of additional contributions. (Contributions to the AMA Scholarship Fund are federal tax-deductible.)

The winners were selected by AMA's Scholarship Committee made up of **Cliff Telford**, chairman, who is also AMA District IV Vice-President; **Art Schroeder**, District II Associate Vice-President; and **John Worth**, Executive Director. The committee considered such factors as National Merit Scholarship Qualifying Test scores, class ranking, and performance in AMA competitions.

Both winners are outstanding students and model flyers, having placed in and won many AMA local, regional and national meets.

Charles Reed's modeling activities have centered around RC Pattern. In 1966 he flew himself right out of the Novice class by taking three Class 3 firsts. From 1967 through 1969, flying Expert, he won first place five times, second twice and third three times. In 1966 at the Nationals at Glenview, Ill., he was the top Junior Pattern entrant. At the Olathe Nats in 1968 he was the best Senior Pattern flyer. Charles attended Raytown High School and was valedictorian for the graduation class. While attending, he was a member of the Senior



1970 AMA scholarship winner [illegible] of Raytown, Mo., calls out that he is ready to begin an RC Pattern flight at the [illegible] Nats at Olathe, Kans., where he won the top Senior age flyer. Bill's dad, left, Charlie [illegible], is one of the mainstays of the AMA chartered Kansas City RC Association.

Miss Susan Weisenbach, shown launching a microfilm-covered Indoor Stick model, also was awarded a $1,000 AMA scholarship. She is from Cleveland, Ohio. Her mom, Marge Weisenbach (right in photo), is the AMA Contest Coordinator for the western part of District III.

Senate, the National Honor Society, and the Kappa Alpha Order. Also, he was named Outstanding Teenager of America. Charles is already enrolled in the University of Missouri at Rolla where his field of study is physics.

Miss Susan Weisenbach has amassed an enviable flying record mostly in the Indoor and Outdoor Free Flight classes, although she took first in CL Sport Flying at the Lakewood Flite Masters Meet last year. She has placed in or won events for Indoor Paper Stick, Stick, and Hand-Launched Glider as well as Outdoor ½A. A and B Gas, Towline Glider, Rubber and Hand-Launched Glider. She was Girl Champion of the Great Lakes Indoor Air Meet in [illegible] and 1969. Likewise, she was Girl Champion of the outdoor Cleveland Junior Air Races from 1967 through 1969, and in 1968 she was the Senior Age Champion. Susan graduated from John Marshall High School this past January. While in high school she belonged to the Color Committee, Mathematics Honorary Society, World Affairs Club, Intramural Volleyball-Basketball Team, and she sang in the choir. Also she was a teacher's aide, office aide, math tutor and spelling champion. Susan has been accepted for fall enrollment in the Kent State University in Ohio. Her planned field of study is aerospace technology.

1971 Scholarship Program

Now is the time to be thinking about the next program to award an AMA scholarship, to be used for 1971 fall enrollment at a college or university. Any current AMA member is eligible who (1) has flown a model in AMA sanctioned competition during 1970, (2) has participated through his school in the National Merit Scholarship Qualifying Test, and (3) graduates from high school in 1970 or 1971.

A Scholarship Application Form must be completed and returned to AMA HQ by each applicant by December 31, 1970. The form is available by sending a request with a self-addressed stamped envelope to AMA HQ, 806 Fifteenth St. N. W., Washington, D. C. 20005.

Relative scholastic achievement among the eligible applicants who take the National Merit Scholarship Qualifying Test will be a major factor the AMA Scholarship Committee will use in determining the winner, as will class ranking and flying achievements. The expectation for 1971 is that there will be at least one scholarship awarded in the amount of $1,000.

AMA's scholarship program also reflects the U.S. Navy's interest in model aviation. Several years ago, there was much concern that AMA activities were becoming increasingly adult-dominated. Navy friends who were involved in the annual National Model Airplane Championships indicated that continued support would be better justified if AMA could show that it had specific youth-oriented efforts in being. Out of this came the now famous "Delta Dart" program for youngsters and also the current scholarship program.

A key element of the scholarship program is the dues allocation feature. This guarantees that AMA [illegible] will be used to support the program and maintain it without sole dependence upon contributions. It was felt that this would provide solid evidence that AMA members were giving more than mere lip service to youth interest. It also permits contributions to supplement and expand the program. With both forms of financial support, the program is stronger than would otherwise be possible.

The 1970 awards are evidence of AMA's growth and maturity. They mark a milestone in the organization's history, suggesting that the activity which began with youth orientation will continue with a positive youth influence. AMA has, in effect, put money behind its talk of youth interest. That's quite an achievement considering that until this year the organization seemed to be forever in debt and unable to do much beyond basic membership services.

It's a new era for AMA and a pleasant change from the atmosphere of uncertainty and frustration that grips the daily scene.

The AMA Scholarship Committee (John Worth, Cliff Telford and Art Schroeder, L to R) met at AMA HQ to review scholarship applications. Write AMA HQ for 1971 scholarship applications.

Record Reviews

A report of selected recent record holders highlighting the designs and equipment used.

Indoor FAI Stick national AMA record, AMA ceiling category I, Open age class: 19 minutes, 58 seconds, established by Harold L. Crane, Hampton, Va., on March 8, 1970.

Photograph shows [illegible] Randolph, left, from Loma Linda, Calif., and Crane watching the record setting model designed by Crane as it neared the floor of the John M. Willis School auditorium in Hampton, Va. The facility with its 20' 1" ceiling height is frequently used for Indoor contests.

The model's center wing chord of 7" is larger than typical FAI class models — this was to increase the wing area within the 65 cm wingspan maximum and reduce the wing loading. Heavy construction (.0375 oz. vs [illegible] usual .025 oz.) was used to gain strength to withstand the ceiling "scrubbing" that took place during much of the flight. Note the extension of the prop spar as seen in the photo; this is to protect the prop during the scrubbing period of the flight.

The wing, mounted off center, has an airfoil of 5% camber. The stab has a similar airfoil — [illegible] 14.5" span by 4¾" center chord. Atwood-type bracing with monofilament dacron was used for the wing.

The prop was of flaring pitch design, although Crane reports no obvious flare on his low torque launches. Launch torque from two strands of .04" x .06" x 16" Micro X Pirelli was indicated as being .3 in. oz. Prop diameter was 17.5", 30" pitch. The model was built from Micro Dyne balsa and covered with slack Micro [illegible] microfilm.

The auditorium in which the flight was made has a small floor area, 58-ft. square, so even minor drift can be a problem. Three stick steers were made during the flight.

FF Outdoor HL Glider national AMA record, Senior age class: 1 minute, 3 seconds, established by Joe Norcross, Hawthorne, Calif., on January 11, 1970.

This record was set at one of the early contests that used the new HL Glider rules which provide for a two-minute max flight limit. Joe's glider was built from the Englet kit produced by 4K's Models. It has a flat wingspan of 18", center chord of 4", triangular airfoil. Likely accounting for the record not being a higher figure is the fact that there [illegible] rain the day of the contest, and the glider would not stay in trim.

CL ½A Profile Proto Speed national AMA record, Junior age class: 80.22 mph, established by James Wade, Anaheim, Calif., on February 21, 1970.

Wade's model was the "Santana" designed by Dale Kirn, published in the Sept. 1968 *American Aircraft Modeler*. It has a wingspan of 18", center chord of 2⅝". The airfoil goes from a lifting section at the center to a symmetrical section at the tips. The stab is 7¾" by 1¾".

A Cox TD 049 engine with a high compression head, left-hand crankshaft and pressure fitting provides power for the 6-oz. model. The prop, by Dale Kirn, is a single-

blader of 4 11/16"D ■ 5"P — glass-filled nylon. Control was accomplished by means of ■ modified Perfect bellcrank enclosed within the wing and a modified Cox plastic control handle.

The fuel tank was Wade's ■■■ pressure type, and the fuel was an original 50% nitro mix. The model was built from Sig balsa. The wing and stab were covered with Mono-Kote, while the balance of the model was finished with Poly-Aqua epoxy. K ■ B streamline wheels were used for the landing gear.

In order to get maximum speed clocking, Wade reports that the takeoff was made with his hand already in the pylon.

FF FAI Power national AMA record, Open age class: 20 minutes, 52 seconds, established by Tom Hutchinson, Pasadena, Calif., on March 8, 1970.

Hutchinson's original design model is named "Ringo-FAI". It is powered by the FAI Special K ■ ■ 15 swinging a Cox 7"D x 3½"P prop. Hutchinson says this engine-prop combination with standard FAI fuel runs at 23,000 rpm.

The model's wing has a span of 62" and 7¾" chord. The plan of the wing tips is a half circle. The rectangular stab has a span of 24" and chord of 5½". Airfoils of both the wing and stab ■■■ similar: 9% thick, flat bottom. The wing was covered with silk, while the stab was double-covered with Jap tissue. Balance point of the model ■ at 75% of wing chord. The model was finished with nitrate dope, then Fullerplast.

The fuselage of the pylon model is of the profile type, except up front where cheek blocks are faired into the special engine mounting pan obtained from Bob Van Nest. The model's rudder, ½" maximum thickness built up and covered with sheet wood, is an integral part of the fuselage, positioned immediately behind the stabilizer.

A Tatone Flood-Off timer was used for stopping the engine which was fed from a modified Perfect tank. Fuse (Mike clothesline) was used for dethermalizing.

FF Coupe D'Hiver Rubber national AMA record, Junior age class: 8 minutes, 37 seconds, established by Steve Miller, Sacramento, Calif., on March 22, 1970.

Steve's model was designed by himself, and has a 3" high pylon wing mount, geodetic wing and stab construction. It has a wing of 32" span, 4⅜" chord; stab of 12" span, 3" chord. Flat bottom airfoils are used for both the wing and stab.

A modified Sig prop, 16" diameter by 20" pitch, was used. It was powered by six 10" strands of ¼" Sig rubber. Sig rubber lube. Sig fuse activated the dethermalizer.

The model was built from Sig contest balsa. It was covered with Jap tissue and finished with Brolite butyrate dope.

Steve reports that the model was in such a booming thermal on the 4th flight of the record series that the model had difficulty returning to the ground even though dethermalized.

CL A Speed national AMA record, Junior ■■■ class: 140.46 mph, established by Danny Bartley, High Point, N. C., on July 17, 1969.

A design by John Bartley, this model has a wingspan of 16" and center chord of 2½", symmetrical airfoil. The stabilizer is 7" x 2". Fuselage length, with a Tatone Class A pan, is 13". The model weighs 14 ■■■■.

The Supertigre G15 engine used for the record flight ■■■ modified by opening up the intake and by the addition of a new back plate for increased crankcase stuffing. The glow plug ■■■ a Fireball cool, and the prop was a Top Flite of 6"D x 7½"P. A single control line ■■■ used operated by a Stanzel handle and ■ ■ R torque unit. Fuel was carried ■■ a pen bladder tank. The model ■■■ finished with orange Hobbypoxy.

FF Outdoor HL Glider national AMA record, Senior age class: 6 minutes, 51 seconds, established by Tim Batluk, Brea, Calif., on February 8, 1970.

Tim's model is a modified Sweepette (designed by Lee Hines, published in the 1964-65 *Zaic Yearbook*) of 18" flat wingspan, 4" center chord, maximum airfoil thickness of ¼" at 25% of chord. Stabilizer of 1/16" sheet has ■ span of 6", 2½" center chord. The planforms of both the wing and stab are quite close to ■ reverse double ellipse. Overall fuselage length is 19" of which 4" extends in front of wing.

The model was built from Sig balsa, ■■■ sembled with Ambroid and Titebond glue. The model was finished with Standard Brands nitrate dope and red dye. The model is equipped with ■ fuse-operated dethermalizer which, upon operation, causes a weight ■■ swing ■■ the rear of the fuselage.

FF Coupe D'Hiver Rubber national AMA record, Junior age class: 6 minutes, 24 seconds, established by Gerry Geraghty, San Jose, Calif., ■■ February 15, 1970.

Gerry's model was the "Mini" designed by Joe Bilgri and published in the Sept. 1967 *Flying Models*. It has a ■■" wingspan, 4" chord, flat bottom airfoil. Stabilizer is 14½" x 2 15/16". The model weighs 82 grams.

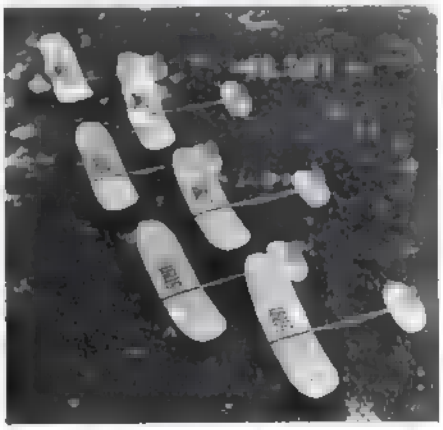
The model was powered by ■ 16" Sig propeller and 6 strands of Pirelli rubber. The front-end assembly was from FAI Model Supply. The model was covered with Sig Jap tissue and finished with Ron Sheldon's nitrate dope. Sig fuse was used for dethermalizing.

CL ½A Proto Speed national AMA record, Junior age class: 84.75 mph, established by Danny Bartley, High Point, N. C., on October 5, 1969.

This model is Danny's own design named "½A Aquarius." It is powered by a Cox TD which has been freed-up — also, the intake has been opened up. Prop was a Cox of 5¼"D x 4"P which had been cut to a 5" diameter. The model's wing has a span of 20" and 3¼" center chord — symmetrical airfoil. The stab is ■" x 1¾", while the fuselage length ■ 12¼".

Single line control was provided by a ½A class H ■ R torque unit in the model and a Stanzel handle. A pen bladder was used for holding the fuel. The fuselage employed a Cox ½A speed pan, and the model was covered with orange Jap tissue, then finished with clear Hobbypoxy.

FF Outdoor HL Glider national AMA record, Open age class: 10 minutes, 20 seconds, established by Bill Blanchard, Sunland, Calif., on January 18, 1970.



Blanchard flew his own-design "Poly" model of which it is obvious from the photo that he has (or had) ■ whole stable-full. He apparently lost one during this series of record flights when the glider drifted out of sight.

The glider has a wingspan of 18", center chord of 4", ¼" thick airfoil at the 25% of chord high point. The stab measures 6" x 3". Fuselage length is 18" — nose section in front of wing is 3½". The model was built from Sig balsa and finished with Sealette and nitrate dope. It has a swinging weight-type dethermalizer operated by ■ fuse.

CIAM Bureau Report

'71 RC World Champs in U. S.?

Maybe, but we're caught in a publishing schedule which only allows us to let you know that AMA officers are working toward this goal even though one of the main go, no-go indicators will have occurred before this issue reaches newsstands. Likely we'll be able to report in the next issue whether this project is progressing on a full steam ahead basis or whether it has been scrapped or modified.

The main story is this. As a direct response by AMA officials to the tremendous FAI Radio Control interest in this country since last year's World Championship, the U. S. has offered to be host to the RC Aerobatic World Championship in 1971. Initial thinking looked toward a possible '73 or '75 bid, but the current interest indicated that an earlier effort should be made. AMA's general proposal was related at the Bureau (officer's) Meeting of the Federation Aeronautique Internationale (FAI) Committee for International Aero Modeling (CIAM) last April. U. S. representatives were **John Patton**, president of AMA and chairman of the CIAM RC Subcommittee, and **Maynard Hill**, AMA FAI coordinator and CIAM secretary.

Several factors have a bearing on whether AMA may be authorized to be host. One of these is that the British equivalent to AMA, the Society of Model Aeronautical Engineers, already had offered to be host in 1971 and had tentative acceptance by the CIAM. Yet there was some indication that the SMAE might be willing to relinquish its prerogative in favor of the U. S.

Another factor concerns economics. A European location for the World Championships means a low cost to the majority of teams in comparison with travel expenses to a U. S. site. CIAM representatives who are mostly European could not be expected to vote for an increase to their own expense unless the U. S. has something very special to offer. The American offer was, therefore, based on reducing that cost to a minimum.

A third factor, which bears on the aspect of something very special to offer, are the facilities and related items of U. S. sponsorship. For this there were already several possibilities at the time of early planning, each very exciting. They included potential sponsors in Las Vegas, Nevada; Spokane, Washington; and Chesapeake, Virginia.

Further progress was dependent upon British response to a specific U. S. proposal which was to be considered by the SMAE by July 1. Such a proposal was developed and submitted on time, and AMA officials were optimistically hopeful of acceptance.

So, while things were still far from definite when this was written, they were looking up and moving fast.

Other Bureau Business

Too strongly expert, was a concern the president of the CIAM, **Sandy Pimenoff** of Finland, expressed regarding the current state of FAI rules and World Championships. He stated that rules for a World Championship must also have maximum appeal to the average modeler whom member nations to the FAI represent, and that perhaps an element of luck should be present.

Henry Nicholls, honorary CIAM president from England, was named chairman of a committee to collect and summarize information about youth modeling programs in the various nations, and to prepare a report titled "Promotion of Aviation Education through Aeromodeling." During the discussion it was noted that AMA is a leader with this kind of program, especially with the Delta Dart.

Binocular FF timing instructions were submitted by the FF Subcommittee with the intention that they be tried out this summer to gain experience before being offered for adoption at the November CIAM Plenary Meeting. Main elements of the instructions call for a magnification between four and eight, for beginning use of binoculars after about one minute of flight (not during launch), for beginning binocular use early enough in the flight so there is no risk of not finding the model, for not exchanging the binoculars between timers during a flight.

Agenda Notice. The annual Plenary Meeting of the CIAM, at which new proposals are discussed and voted upon, was set for Paris, France, December 3-4, 1970. An AMA member wishing to have an item appear on the agenda should submit it to AMA HQ no later than September 1, 1970. Items to be considered must appear on the agenda which is prepared and circulated in advance. Each proposed change to FAI regulations should (1) quote the relevant paragraph and heading from the FAI Sporting Code, if known, (2) detail exactly what the alteration or addition to the wording should be, and (3) give the reasons behind the proposed alteration in a short, separate paragraph. Such proposals will be reviewed by AMA's FAI Executive Committee for possible inclusion in the official U. S. agenda material.

NAA Council Acts for Sport Aviation

The **National Sport Aviation Council** is becoming increasingly useful to the more than 80,000 sport aviation enthusiasts who make up the membership of associated organizations within the **National Aeronautic Association.** As the Federal Aviation Administration increases its hold on the management of the nation's airspace, it is the NSAC that has spoken and acted on behalf of those pilots who fly for recreation and sport and do not need to use the air traffic system built and operated for the commercial airlines.

The NSAC was formed in 1968 as a National Aeronautic Association committee to serve the needs of the nine NAA divisions and affiliates that are concerned with all phases of sport aviation activity. **William H. Ottley,** executive director of the **National Pilots Association** and secretary of the **U. S. Parachute Association,** serves as NSAC chairman; **John Worth,** executive director of the **Academy of Model Aeronautics,** is vice-chairman. Member groups include:

Academy of Model Aeronautics
Aerobatic Club of America
Balloon Federation of America
Experimental Aircraft Association
National Aeronautic Association
National Pilots Association
Professional Race Pilots Association
Soaring Society of America
U. S. Parachute Association

At the present time the NSAC is active in four important fields affecting sport aviation:

1. It encourages the FAA to maintain the floor of positive control areas at sufficiently high altitudes so as not to interfere with sport flying and parachute jumping. Likewise it is urging the FAA to refrain from designating vast new areas of positive controlled airspace around certain busy airline terminals.

2. It is pressing for uniformity and simplicity in the procedures for obtaining FAA authorizations for special sport aviation events such as racing, aerobatics, skydiving and fly-ins.

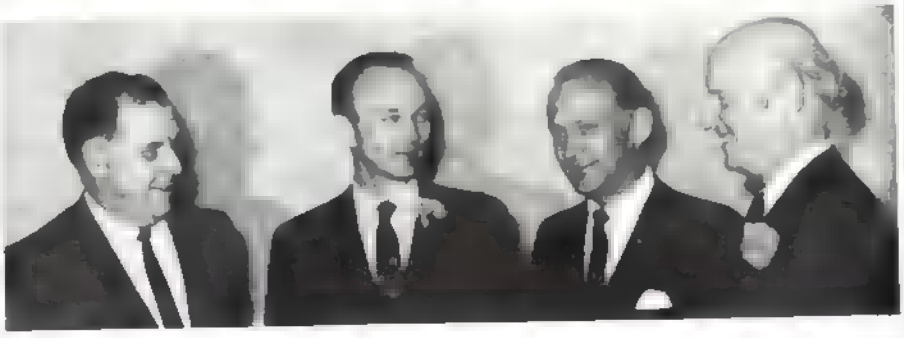
3. It works closely with FAA to ensure that sport aviation events continue to be possible — and legal — in all parts of the country, and opposes attempts to designate only certain limited, widely scattered areas of reserved airspace for these sport activities.

4. The NSAC speaks for its more than 80,000 members in discussions with the government on the allocation of user charges newly imposed by Congress on the aviation community. NSAC, representing a large group with no need for the ever-more elaborate air traffic control system, has taken the position that it is unfair and unjust to require sport flyers to pay taxes for a system they do not use.

Meetings of the Council are held approximately once each quarter; special meetings are called when unusual situations arise. The council has made it a regular practice to meet at least once a year at a major sporting event of one of its member groups. In 1969, for example, the NSAC met during the **National Model Airplane Championships** at Willow Grove Naval Air Station in Pennsylvania. Council members were also given a tour of the competition activities and were particularly impressed with the RC competition and the "Delta Dart" youth program.

Such field meetings give each council member a better picture of the activities and needs of related sport aviation groups. This promotes understanding and appreciation of how each group operates and what problems are involved. The end result is a closer working relationship of all organizational representatives, encouraging all to speak as one voice for mutual interests.

For AMA, **John Worth** and **Walt Good** have served as representatives since 1968. The 1970 field meeting is scheduled for August during the annual **Experimental Aircraft Association Fly-In** at Oshkosh, Wisconsin. At the Fly-In, incidentally, EAA will schedule a Delta Dart program for youngsters as was done last year.



AMA was represented as aviation's most prestigious award, the Collier Trophy, was presented to NASA's Apollo XI landing crew last May. Shown during pre-award ceremonies in Washington, left to right, are John Worth, AMA executive director; Astronauts Mike Collins and "Buzz" Aldrin; and Fred Lee, president of the National Aeronautic Association. Neil Armstrong, first AMA member on the moon, was in Houston for the Apollo XIII accident investigation.

AMA News Bits

Retires for a Year, Still Tops

Joe Foster is reported to have been inactive for a year, but this did not render him any the less competitive. He attended the **AMA sanctioned Fresno Air Races** last May and took first in RC Pylon Racing Form. I — and there was stiff competition as evidenced by a three-way tie between Foster, **Whit Stockwell** and **Larry Leonard** at the end of the normally scheduled races. Two flyoff heats resulted in Foster placing first, Stockwell second and Leonard 3rd. Foster was flying a Shushonik Racer (Francis Products) which was awarded only 14 handicap points because he had inadequate scale reference. (This is the same Joe Foster who formerly was National Champion and Wakefield World Champion.) **Tom Protheroe's** DeKnight Special was awarded 20 handicap points. Fastest race time was clocked by **Jack Hertenstein** — a sizzling 1 minute and 45 seconds — but he placed 24th.

Contest Director Alex Chisolm strongly urges pre-entry for RC racing events. He says this allows for scheduling races the night before, saving much time for racing. The no-shows (11 out of 47) didn't disturb anything, according to the CD's report.

Longitudinal Dihedral

That's the correct nomenclature for the angular difference between wing and stabilizer that most of us call "incidence" or "decalage," according to *SHOC Talk*, the monthly paper of the **AMA chartered Sky Hoppers of Orange County**, Calif., edited by **Paul Ryan**. According to the paper the least correct term is "decalage," which has no business in the vocabulary of the contest-type Free Flighter. "Decalage is the difference of angle of attack between the upper and lower wings of a biplane!"

RC Pylon Race Down Mexico Way

Guest speaker for a meeting of the **AMA chartered MARKS Club** of San Bernardino, Calif., was **George Killeen** of Kraft Systems who had attended the Mexican Nats a short while earlier. According to the club's *News Letter* edited by **Betty Auman**, he told them of the difficulties of model flying in Mexico City's high elevation, and how racing is more important there than aerobatics. Mexican racing is around a two-pylon setup, 8 laps. Killeen said he found out only 10 minutes before the contest began that their rules require a model to have a cockpit and pilot. Fortunately, a fast paint job allowed his wedge-wing Open Pylon Racer to qualify, and he proceeded to win first place.

Long Control Rod

Looking for some long 1/16" diameter wire that can be threaded for control rods? The *Smoke Signals* publication of the **AMA chartered Meroke RC Club** in Bethpage, N. Y., edited by **Ed Yulke**, passes on a tip by Meroke member **"Hap" West**. He suggests using some of the thinner wire clothes hangers employed by many cleaning establishments. When straightened, hanger wire is good for many things when the strength and stiffness of music wire isn't needed.

Old-Time Covering Recalled

In a recent meeting of the **AMA chartered McDonnell Radio Control Club**, St. Louis, Mo., a considerable amount of time was devoted to a round-table discussion of new construction and finishing techniques. In a *Carrier Wave* report following the meeting, club President **John Rawlings** said, "I guess the new coverings *are* pretty good, but the modelers who didn't 'enjoy' the austerity of the 1930's will never realize the thought patterns involved with finding a *cheap* covering for a model." Going on, Rawlings said, "Some of us remember covering a large 'gassy' with batiste (that's very thin cotton cloth used for such things as infant's clothing) and when a flowered print was used, one became a candidate for the original 'Flower People.' The model was a conversation piece, too!" he said. "Batiste, then, was from 35 cents to 55 cents a yard with widths ranging from 36 to 54 inches, or about one cent per inch on a running yard length. After doping, the covering was almost as strong as silk, much cheaper, and about 5% heavier."

Rawlings said that he even tried newspaper for covering once, but he related that this material has at least one serious drawback. Should a newspaper-covered model land in a weed patch, it likely will be retrieved without any of the covering in good condition — it's not very durable!

My, how times have changed!

RC Fly-In Helps Mini-Park

Last May the **AMA sanctioned Kiwanis/WCRC Fly-In** was put on at the Spartanburg Municipal Airport in South Carolina to help the **Kiwanis Club** raise money for their mini-park project. Sale of concessions was the source of income. **AMA Contest Director John Nicholson** reports spectator attendance for the two-day affair to be about 3,500. He says the crowd was orderly and well controlled, and the 25 participating flyers operated their RC planes in a safe, exciting and sportsman-like manner.

Field-Built HL Glider

When the **AMA chartered San Valcers club** in California participated in the Postal Contest of the **National Free Flight Society**, **Dennis Bronco** really went all out. For the contest the German HL Glider rules were used which provide for scoring the best six of 10 flights, one-minute maxes and 15-second progressive flyoffs. According to **Tom Hutchinson** in the club's paper, *Satellite*, Bronco started out spectacularly with five straight maxes before losing his only glider.

Chuck South photo

Left: Fastest Form. 17 Bob Smith's 1:38.6 Minnow may be. Has laminar flow wing, Lee K 8 power. Middle: John Arthur's Class 8 "Plague" is really 'hot' — Jacksonville meet first. Below R: Publicity photo for May LIAMAC Indoor Meet — Barry Pallet launching scale Chipmunk.

Tom Carman photo

Submitted by Jean Pallet

Baseball fans saw a 20-minute model flight demonstration during a double-header at Chicago's White Sox Park earlier this year. The Aero Angels and Model Masters clubs produced the show. Flyers assemble at left, 'hot dog' casualty below.

Photos submitted by Jim Davis

Undaunted, he secured a glider kit and proceeded to build it on the field with the aid of Hobbypoxy Formula 4 glue. In the meantime the weather had deteriorated, so fine trimming wasn't possible. Nonetheless, he clocked 58 seconds on his next to last flight to wind up just two seconds short of all maxes. That's perseverance!

RC Cross Country Meet

The **AMA chartered Baron's Model Club** is planning a contest patterned after the old Thompson Trophy Races at Spokane, Wash., August ▮ and 9. In this event the entrant gives **Contest Director Dick Carson** his estimated time of arrival (ETA) for the flight from "L.A." to "Cincinnati." His fuel used is calculated, and the plane must land at four check points along the way — where a sticker is put on the plane at each landing to designate the "city" visited. A combination of ETA and fuel used will determine the winners for the 25 and 50-mile races.

Old Time CL Stunt

The idea for "antique" models has been with Free Flight for some time; now, it appears that it may be invading CL Stunt, according to the *Newsletter* of the **Association of Model Airplane Clubs of N. Y.** There will be an event for Old Time Stunt in the fall meet of the **AMA chartered Garden State Circle Burners**, with the intent being to perpetuate and preserve the designs used during the era in which Stunt was advancing from the early free-style type of flying to the precision flying of today. The club also feels that their old-time event will be well suited to newcomers. The Circle Burners' rules provide for the design (kit or plan) to have been available prior to Dec. 31, 1952, and for use of the AMA 1951-52 rules with a few exceptions. Current AMA safety rules will apply, no appearance points will be awarded, ▬ airplane design without wing flaps will receive 20 bonus points, and use of a spark ignition engine will receive 10 bonus points.

RC Net Organizer

Believing that a fair percentage of RC modelers are also active Hams, **Jack Mathias** (W9FMW) is interested in forming an "**RC Net**" through which RC information could be exchanged throughout the country. This could be beneficial to the sport in general and, more specifically, to each RC'er. Those wishing to participate in the formation of the "RC Net" should write to Jack Mathias, 721 South Meadow Rd., Evansville, Ind. 47715. He will then respond and set ▪ time and radio frequency for initial contact on Amateur Radio. After the groundwork is done, look to these pages for the time and frequencies of the Net meetings.

Promotes Junior Interest

The president of the **AMA chartered Maxecuters Model Airplane Club**, suburban Wash., D. C., recently presented his idea for ▪ club Junior Program. **Jerry Weir's** proposal, which subsequently was adopted, provides for the club to give each Junior entering the club a basic beginner model to build, with assistance of other club members, ▬ club meetings. When he finishes the model (a Zaic *Fling-Hi* HL Glider was selected) he ▬ then given his second model. The program continues through five models, each harder to construct than the previous. A special award is planned for each Junior who has successfully completed all the models in the series.

CL'ers Outdo FF'ers in HL Meet

The powers that be in the FF oriented **AMA chartered Minneapolis Model Aero Club**, Minn., were striving for a better turnout ▪f MMAC members for the second HL Glider contest put on by a Control Line club ▬ the area. Seems that the FF group did not do as well at their own game as they thought they should. "Liniment is cheap!" said the MMAC paper, *Minneapolis Modeler*.

New RC Fun Event

District I AMA Associate Vice-President **John Ross** reported a new fun event that he had heard of ▬ a recent issue of *Relay Chatter*, newsletter of the **AMA chartered New England Radio Control Modelers** (Mass.). Should really be something if it works. The idea is to strap a paper cup atop the fuselage, then fill it with water. The model takes off, does a loop, a barrel roll, lands, and taxies back. The winner is the ▬ who returns with the most water.

Watch Round Battery Packs

The **AMA chartered Kansas City Radio Control Assn.** publication, *Contacts*, cautions all those who fly RC models with round receiver battery packs that they are prone to rotating with vibration. Bad results were recently observed, it was reported, when a twisting battery pack shorted the receiver wires — scratch one Kwik Fli and lots of servo gears! The club paper suggests that ▪ piece of plywood or balsa be taped to such battery packs to make sure that they stay put.

Contact Paper for Masking

Dave Bishop suggests that many may find ▬ of standard contact paper to be an improvement over masking tape for obtaining ▪ neat guide for painting insignia or numbers. Bishop said it took him an hour to paint one iron cross ▬ his ME 109 when he used masking tape. With the other iron crosses he masked with contact shelf paper, reducing the time to about ten minutes per cross. This information came from *Contrails*, newsletter of the **AMA chartered Charleston Radio Control Society** (S. C.), **Ken Gulliford**, editor.

Discuss to Learn

In *Relay Chatter*, newsletter of the **AMA chartered New England Radio Control Modelers**, Editor **R. J. Reynolds** told club members how he once had ▪ ground school instructor tell him that the best way to learn something ▬ to try to teach it. "If this is true," said Reynolds, "then I submit that the second best way is to discuss it." He related how this is done by practically all modelers at hobby shops, flying fields, etc., but the good effects are limited because the ideas seldom get beyond the few people involved in the conversation. The ideas presented get much more widespread attention when they are contained in the mailbag columns of national magazines — but a happy medium for the presentation of ideas, which many modelers seem to overlook, is their own club newsletter. Reynolds invites members of the NERCM to try it in *Relay Chatter*; no doubt most all newsletter editors will be similarly receptive to printing contributions of club members.

Photos by Carl Summers

The 5th Annual Spring Contest of the AMA chartered Dallas RC Club attracted 57 flyers with 73 entries. One aspect that made the club happy was the ▬ even spread of entries in the A, ▮, D/Novice and D/Expert events. Contest Director Robert Brown said, "The beginning flyer is definitely making use of Classes A and B." At far left is Bill Knost, Dist. VIII RC Contest Board member, who keeps his finger on the RC pulse by attending meets. Bill Thomas, below, from Bartlesville, Okla., ▬ the D/Expert winner, while the middle photo shows the overall contest scene.

AMA News Extra . . . . .

UPDATE OF AMA COMPETITION RULE CHANGES, INTERPRETATIONS

Usually AMA rules are changed but once a year, the effective date being January 1 of the next year, but occasionally rules are found to cause such severe problems, or are subject to several interpretations, that the Contest Boards take action to correct the situation without waiting for the normal yearly cycle. The following rule changes and interpretations resulted from such considerations.

Control Line

Junior C Speed. Effective immediately, the line length for this .40 cu. in. max engine class is reduced to 60 feet (from 70'), the timed course to consist of seven laps; minimum wire diameters remain .031" (single) and .018" (two).

½A Speed and ½A Proto. Effective immediately, the pull-test is reduced to 25 times the model's weight (from 40 G's).

Scale Racing (Goodyear). The Contest Board has interpreted the rule regarding the eligibility of prototypes to mean that any Formula I racer of the 190 cu. in. class is eligible. Regarding acceptability of Scale Racing models relating to documentation, the Scale Advisory Committee chairman, Claude McCullough, with the concurrence of CL Contest Board Chairman Laird Jackson, has issued an interpretation that if the three-view plan submitted comes from an approved source as listed in the rules, page 58, sec. 25.2.3, then the judge must base his assesment only on it and not his personal opinion or knowledge ■ to the accuracy of the plan.

Radio Control

Pattern Class D (FAI). An error has been detected in the FAI Sporting Code, which was repeated in the AMA rule book, page 50, sec. 5.13, last sentence of second paragraph. This sentence should be corrected to read, "One motor must be running during execution of the maneuvers 5.13.1 to 5.13.13 inclusive," which means that the Rectangular Approach and Landing may be completed dead-stick.

Pylon Racing. The RC Contest Board Chairman, Bill Northrop, advises that his interpretation of the current throttle rule for Formula ■ and Formula II requires a carburetor of the single barrel type which directly controls, by radio command, the volume of air (and indirectly the volume of vaporized fuel) entering the engine--able to reduce engine RPM sufficiently to permit the aircraft to be landed if and when required. Use of needle valve trim and/or shut-off alone does not comply with the rule according to the chairman's interpretation; however, he notes the possiblity that the rule may be changed for 1971.

RC MASTERS

Thirty-three of the top U.S. RC Pattern flyers will assemble at Memphis, Tenn., on September 26-27, to compete for the three places on the 1971 U.S. RC Aerobatic World Championship Team. The AMA chartered Memphis RC Club is host to this important contest, known as the RC Masters, and the Radio Control Industry Assn. is ■ major sponsor.

The host club's plans include ■ Saturday-night banquet and provisions for a large number of spectators, both AMA-type and the general public, for what will probably be the finest RC Pattern meet ever held in this country. Contest flying will take place at the Memphis RC Club's field, about 10 miles northeast of Memphis.

Motel space is likely to be scarce, as flyers and officials alone are expected to fill about fifty rooms. It is suggested, therefore, that reservations be made early at one of the nearby motels: Meet headquarters is the Admiral Benbow Inn, 4720 Summer Ave., Memphis, phone (901) 682-4601; alternatives are the Holiday Inn, 4941 Summer Ave., phone (901) 683-2411; or the Ramada Inn, 5225 Summer Ave., phone (901) 682-7691.

By special arrangement with the publisher this page is produced at the very last minute, just before the magazine is printed, to bring you the latest news concerning current Academy of Model Aeronautics events of national significance. ■■

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

Aug. 1-2 — Erie, Penn. (A-Entry Restricted) Demonstration/Air Show. Site: Port Erie International Airport. M. Blue CD. 22 Hall Ave., Lake City, Penn. 16423. Sponsor: **Erie Model Control-liners.**

Aug. 2 — Mentor, Oh. MARCS ¼ Midget RC Pylon Race. Site: Club Field. F. Vidmar CD. 26500 Zeman Ave., Euclid, Oh. 44132.

Aug. 2 — Sacrattento, Calif. (A) Northern Calif FF Council (Fun Contest). Site: Weagel Field. B. Fallon CD. 2667 61st St., Sacramento, Calif. 95817. Sponsor: **Capitol Condors.**

Aug. 8-9 — Flossmoor, Ill. (AA) 3rd Annual SAC RC Meet. Site: Flossmoor Rd. & Central Ave. S. Peterson CD. 6416 So. LaPorte, Chicago, Ill. 60638. Sponsor: **Suburban Aero Club of Chicago.**

Aug. 8-9 — Saginaw, Mich. (AA) Saginaw Valley Annual RC Meet. Site: SVRCC Flying Field — 2240 Lone Rd. G. Gill CD. 2020 Lone Rd., Freeland, Mich. 48623. Sponsor: **Saginaw Valley RC Club, Inc.**

Aug. 8-9 — Spokane, Wash. Baron's Cross Country Fly-In. Site: 4 Mounds Area West of Spokane. D. Carson CD. W. 3029 Hoffman, Spokane, Wash. 99205. Sponsor: **Baron's Model Club.**

Aug. 8-9 — Colorado Springs, Colo. (AA) Pikes Peak RC Pattern Meet. Site: Pikes Peak RC Club Field. B. Haghurst CD. 1219 Oswego, Colorado Springs, Colo. 80904. Sponsor: **Pikes Peak RC Club.**

Aug. 9 — Ohio City, Oh. (A) Club RC Contest. Site: Club Field. D. Kraner CD. RR 1, Ohio City, Oh. 45874. Sponsor: **SHOO Flyers MAC, Inc.**

Aug. 9 — Fort Worth, Tex. (AA) Southwest RC Pylon Racing League Meet. Site: Thunderbird Field J. Simpson CD. 5709 Wharton, Fort Worth, Tex. 76133.

Aug. 9 — Baton Rouge, La. (AA) Bayou State CL Model Airplane Championships. Site: L.S.U. Grounds. G. Cleveland CD. 340 Gebelin St., Baton Rouge, La. 70802.

Aug. 9 — Portville, N. Y. (AA) Southern Tier RC Pylon Meet. Site: Olean Model Airplane Club Field B. Brown CD. 1255 High St., Bradford, Penn. 16701. Sponsor: **Olean Model Airplane Club.**

Aug. 9 — Hastings, Minn. (AA) MMAC Silent CL Meet. Site: Webers Airstrip L. Stockstad CD. 2648 Carlson Dr., Coon Rapids, Minn. 55433. Sponsor: **Minneapolis Model Aero Club.**

Aug. 9 — Lancaster, Oh. (AA) F.O.R.K.S. Annual RC Bash. Site: F.O.R.K.S. Field. J. Slater CD. 809 Forest Rose Ave., Lancaster, Oh. 43130. Sponsor: **Fairfield Ohio Radio Kontrol Society, Inc.**

Aug. 9 — Lincoln, Neb. (AA) Aero-Design 3rd Annual CL Summer Meet. Site: Humane Society Park J. Mock CD. 851 N. 42nd St., Lincoln, Neb. 68503. Sponsor: **Aero Design Flying Club.**

Aug. 9 — Detroit, Mich. (AA) 24th Great Lakes CL Internationals. Site: Ronge Park. A. Adamson CD. 22454 Fairfax, Taylor, Mich. 48180. Sponsor: **Strathmoor Model Club.**

Aug. 9 — Kenosha, Wisc. (A-Entry Restricted) DeKalb Flying Circus FF Meet. Site: Bong Field H. Heminger CD. 102 W. Montana, Glen Ellyn, Ill. 60137.

Aug. 9 — Denver, Colo. (A) Monthly FF Old Timers Meet. Site: East Colfax Airpark. W. Baldridge CD. 1164 So. Lafayette St., Denver, Colo. 80210. Sponsor: **Model Museum Flying Club.**

Aug. 15-16 — Jacksonville, Fla. (AA) RC Club of Jacksonville Annual RC Meet. Site: Imeson Airport. H. Pierce, Jr. CD. 208 W. Forsyth St., Jacksonville, Fla. 32202. Sponsor: **Jacksonville RC Club.**

Aug. 15-16 — Tacoma, Wash. (AA) Mt. Rainier Summer RC Championship Contest. Site: Mt. Rainier RC Soc. Field. B. Gale CD. 811 9th Ave., S. W., Puyallup, Wash. 98371. Sponsor: **Mt. Rainier RC Society.**

Aug. 15-16 — Converse, Ind. (AA) 3rd Annual Converse RC Flying Club RC Meet. Site: Converse Airport. W. Hutchins CD. 201 E. Main St., Portland, Ind. 47371. Sponsor: **Converse RC Flying Club.**

Aug. 15-16 — San Diego, Calif. (AAA) Southern Calif. CL Regionals. Site: Robb Field. R. Perry CD. 1659 Bermuda Ave., San Diego, Calif. 92107. Sponsor: **Mission Bay Prop Twisters.**

Aug. 15-16 — Endicott, N. Y. (AA) 15th Annual RC Contest. Site: Tri-Cities Airport. R. Noll CD. 96 Pine Knoll Rd., Endicott, N. Y. 13760. Sponsor: **Aeroguidance Society, Inc.**

Aug. 15-16 — Wichita, Kans. (AAA) 3rd Annual Wichlhawks Fall FF & CL Rally. Site: Wichita Modelers Council Field, J. Finley CD. 3217 Murdock, Wichita, Kans. 67208. Sponsor: **Wichlhawks Model Airplane Club.**

Aug. 15-16 — Minneapolis, Minn. (AA) 14th Annual T.C.R.C. RC Meet. Site: T.C.R.C. Field. J. Duncan CD. 3835 Tonkawood Rd., Minnetonka, Minn. 55343. Sponsor: **Twin City RC Club.**

Aug. 15-16 — Virginia (AA) NVRC-FARC 8th Annual RC Meet. Site: To be determined. C. Scott CD. 3626 Annandale Rd., Annandale, Va. 22003. Sponsor: **Northern Virginia Radio Control Club.**

Aug. 16 — Alliance, Oh. Alliance Carnation City RC Fly for Fun Meet. Site: Barber Airport. G Villard CD. 3301 23rd St., N. W. Canton, Oh. 44708. Sponsor: **Alliance Balsa Bees RC Club.**

Aug. 16 — Westminster, Md. (AA) Westminster CL Meet. Site: Westminster Shopping Center. R. Pease CD. 65 E. Main St. Westminster, Md. 22157. Sponsor: **Westminster Aero Modelers.**

Aug. 16 — New York, N. Y. (AA) Assoc. of M.A.C. of Greater N. Y. CL Meet. Site: Flushing Meadow Park — Flying Field. W. Boss CD. 145-24 223rd St., Laurelton, N. Y. 11413.

Aug. 16 — Haymarket, Va. (AA) Second Annual FF Contest. Site: Snow Hill Farm. J. Clawson CD. 1846 Lusby Pl., Falls Church, Va. 22043. Sponsor: **Fairfax Model Associates.**

Aug. 16 — Fredonia, N. Y. LSAM Fly for Fun RC Meet. Site: LSAM Field. Lake Rd. A. Hemenger CD. 1031 Central Ave., Dunkirk, N. Y. [redacted]

Aug. 16 — Pike, N. Y. (AA) Western N. Y. FF Assn. Meet. Site: Junction of Rts. [redacted] & 19 E. Evans CD. Box 87 N. Main, Richburg, N. Y. 14774.

Aug. 16 — Green Bay, Wisc. Summer RC Fun Fly. Site: Austin Straubel Field. [redacted] Cowles CD. 2424 Duharme Ln., Green Bay, Wisc. 54301. Sponsor: **Green Bay R.C.F. Club.**

Aug. 16 — Glen Ellyn, Ill. (A-Entry Restricted) Fox Valley Model Aero Assn CL Meet. Site: North Park. H. Heminger CD. 102 W. Montana, Glen Ellyn, Ill. 60137. Sponsor: **DuPage Thermal Riders.**

Aug. 16 — Valley Park, Mo. Signal Chasers Fly-For-Fun Meet. Site: Buder Park. R. Underwood CD. 4109 Concord Oaks Dr., St. Louis, Mo. 63128. Sponsor: **Signal Chasers RC Club, Inc.**

Aug. 16 — St. Louis, Mo. (AAA) Mid-western CL Model Airplane Championships. Site: Buder Park Model Flying Field. A. Schaeter CD. 4206 Virginia Ave., St. Louis, Mo. 63111. Sponsor: **St. Louis Yellow Jackets, Inc.**

Aug. 22-23 — Decatur, Ala. (AA) Decatur MAC 5th Annual RC Contest. Site: Courtland Air Base. E. Minter CD. 2317 Calumet Ave., S. E., Decatur, Ala. 35601. Sponsor: **Decatur Model Airplane Club.**

Aug. 22-23 — Pontiac, Mich. (AA) 1st Annual AMA RC Contest. Site: Club Field J. Frazer CD. [redacted] Beverly, Pontiac, Mich. 48053. Sponsor: **Pontiac Model Airplane Club.**

Aug. 22-23 — Lakehurst, N. J. 2nd Annual RC Soaring Contest. Site: Lakehurst Naval Air Station. D. Sarpulus CD. 32 Alameda Ct., Shrewsbury, N. J. 07701. Sponsor: **Monmouth Model Airplane Club, Inc.**

Aug. 22-23 — Great Falls, Mont. Big Sky RC Modelers Annual RC Fun Fly. Site: BSRCM Field T. Walker CD. 16 Aspen, Great Falls, Mont. 59401. Sponsor: **Big Sky Radio Control Modelers.**

Aug. 22-23 — Omaha, Neb. (AA) Omahawks 16th Annual RC Contest. Site: Omahawks Flying Site R. Hess CD. 11720 Cedar, Omaha, Neb. [redacted]

Aug. 22-23 — Orange, Mass. (AA) 17th Annual N.E. RC Championships. Site: Municipal Airport. C. Olson, Jr. CD. P. O. Box 51, Auburn, Mass. 05101. Sponsor: **New England Radio Control Modelers, Inc.**

Aug. 22-23 — Fargo, N. D. (AA) 13th Annual Red River Valley CL Championships. Site: F. M. Skylarks Flying Field. M. Olson CD. 305 27th Ave., N., Fargo, N. D. 58102. Sponsor: **F. M. Skylarks.**

Aug. 22-23 — Greenwood, S. C. (A) Piedmont Fun-Fly. Site: Abbeville Airport. R. Thompson CD. Rt. 1, Box 57 H. 6, Sumter, S. C. 29150. Sponsor: **Greenwood Radio Aircraft Modeling Society.**

Aug. 22-23 — Corpus Christi, Tex. (AA) Corpus Christi Bees RC Meet. Site: Cabanis Field R. Corder CD. [redacted] Shamrock, Corpus Christi, Tex. 78412. Sponsor: **Corpus Christi Bees.**

Aug. 22-23 — Cloverdale, Ill. (AA) [redacted] Annual AMA RC Contest. Site: Club Flying Field H. Mosquera CD. 361 N. Arrowhead Trail, Carol Stream, Ill. 60187. Sponsor: **West Suburban RC R's, Inc.**

Aug. 23 — Mansfield, Oh. (AA) Electronic Flyers RC Meet. Site: Mt. Zion Road M. Kalish CD. 235 Cline Ave., Mansfield, Oh. 44907. Sponsor: **Electronic Flyers.**

Aug. 23 — Gridley, Calif. (AA) West Coast R.O.W. FF Championships. Site: Thermolito After Bay Lake. W. Vanderbeek CD. 630 Ashton Ave., Palo Alto, Calif. 94306. Sponsor: **900 Club.**

Aug. 23 — Davenport, Ia. (AA) Davenport Model Airplane CL Meet. Site: Davenport Municipal Airport. J. Kroeger CD. 4218 So. Zenith Ave., Davenport, Ia. 52802. Sponsor: **Davenport Model Airplane Club.**

Aug. 23 — Muncie, Ind. (AA) Mid-States Model Plane CL Championships. Site: West Side Park. J. McDonald CD. Box 384, Daleville, Ind. 47334.

Aug. 23 — Albany, Ore. (AA) N. W. Free Flight Championships. Site: Parker Field J. Shafer CD. P. O. Box 322, Dallas, Ore. 97338. Sponsor: **Willamette Model Club, Inc.**

Aug. 23 — Johnsville, Penn. (AAA) Eastern States FF, CL & RC Championships. Site: Johnsville Naval Air Facility R. Leishman CD. 167 Goldenridge Dr., Levittown, Penn. 19057.

Aug. 23 — Denver, Colo. Air Frolics. RC Eyeball Scale Aerobatics. Spec. Pylon. Rules available from CD. Site: Jefco Field D. Johnson CD. 12604 W. Virginia Ave., Denver, Colo. 80228. Sponsor: **Jefco RC Club.**

Aug. 29-30 — Tulsa, Okla. (AAA) Tulsa Glue Dobbers 21st Annual FF, CL, & RC Model Airplane Championships. Site: 145 E. & 41 Sts., S. W. Kehr CD. 4940 N. Johnstown, Tulsa, Okla. 74126. Sponsor: **Tulsa Glue Dobbers.**

Aug. 29-30 — St. Charles, Mo. (AA) Thirteenth Annual McDonnell RC Meet. Site: Conductron Plant. W. Feldmeir CD. 2955 Clearview Dr., Normandy, Mo. 63121. Sponsor: **McDonnell RC Club.**

Aug. 29-30 — Billings, Mont. (AA) Billings Flying Mustangs RC Meet. Site: Mustang Field. A. Darnielle CD. 3043 Bartonia Blvd., Billings, Mont. 59102. Sponsor: **Billings Flying Mustangs.**

Aug. 29-30 — So. El Monte, Calif. (AA) West Coast RC Championships. Site: Whittier Narrows J. Garabidian CD. 909 N. 3rd St., Montebello, Calif. 90640. Sponsor: **San Gabriel Valley RC.**

Aug. 29-30 — Livermore, Calif. (AA) League of Silent Flight — 1970 RC Soaring Tournament. Site: Hummingbird Haven. R. Andris CD. B [redacted] Mission Station, Santa Clara, Calif. 95051. Sponsor: **South Bay Soaring Society & North Bay Soaring Society.**

Aug. [redacted] — Marietta, Ga. (AA) 3rd Annual CCRC Meet. Site: Club Field J. Harper CD. 900 Piedmont Circle, Marietta, Ga. [redacted] Sponsor: **Cobb County Radio Control Modelers.**

Aug. 29-30 — Fentress, Va. (AA) Tidewater RC V Annual AA RC Meet. Site: Fentress Aux. Air Field. B. Miller, Jr. CD. [redacted] Cape Henry Ave., Norfolk, Va. 23513. Sponsor: **Tidewater RC.**

Aug. 30 — Levant, N. Y. First Annual Fly for Fun & Auction. Site: Blanchard Road. W. Johnson CD. 62 Widrig Ave., Jamestown, N.Y. 14701. Sponsor: **Flying Rebels of Jamestown, N. Y.**

Aug. 30 — East Meadow, L. I., N. Y. (AA) L.I.M.A.C. Annual FF & RC Contest. Site: Mitchel Field, R. Lampione CD. 32-15-35 St., Astoria, N. Y. 11106.

Aug. 30 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD. 1725 Kenmore Dr., W., Fresno, Calif. 93703. Sponsor: **Fresno Gas Model Club.**

Aug. 30 — Rockford, Ill. (A-Entry Restricted) Rockford Fox Valley CL Meet. Site: Riverdahl Park. A. Johnson CD. [redacted] Oslo Dr., Rockford, Ill. 61108. Sponsor: **Rockford Aeromodelers.**

Aug. 30 — Chardon, Oh. (AA) CRC 8th Annual RC Pattern Contest. Site: Club Field. F. Vidmar CD. 26500 Zeman Ave., Euclid, Oh. 44132.

Aug. 30 — Bloomington, Ill. (AA) 1st Annual Plug Burners CL Meet. Site: Bloomington Municipal Airport. J. Dew CD. 1304 Vernon Dr., Normal, Ill. 61761. Sponsor: **Plug Burners.**

Aug. 30 — Chicago, Ill. (AA) Chicago Scalemasters 2nd Annual FF, CL & RC All Scale Rally. Site: CRCM Field. D. Platt CD. 4512 S. LaCrosse, Chicago, Ill. [redacted] Sponsor: **Chicago Scale Masters.**

Aug. 30 — Detroit, Mich. (AA) 1st Annual RC Pylon Racing Championships. Site: 18 Mile & Mound Rd. H. Mottin CD. 2124 Common Rd., Warren, Mich. 48092. Sponsor: **Radio Control Club of Detroit.**

Aug. 30 — Rochester, N. Y. (AA) United RC Pylon Racing Circuit Meet. Site: Monroe County Model Airport. H. DeBolt CD. 3833 Harlem Rd., Buffalo, N. Y. 14215. Sponsor: **Radio Control Club of Rochester.**

Aug. 30 — Vineland, N. J. (AA) "A Day at the CL Race." Site: Vineland High School. P. Haley CD. Braddock Ave., RFD No. 5, Hammonton, N. J. 08037. Sponsor: **South Jersey Aeromodelers.**

Aug. 30 — Rialto, Calif. (AA) Thunderbirds 2nd Annual CL Meet. Site: South Rialto Park. R. Seale CD. 214 South Riverside, Rialto, Calif.

Sept. 5-6 — St. Joseph, Mich. (A) Whirlwinds 1st Annual RC Contest. Site: Whirlwinds Alt. Field. C. Ellis CD. 3383 Valley View Dr., St. Joseph, Mich. 49085. Sponsor: **Whirlwinds of Southwestern Michigan.**

Sept. 5-6 — Dallas, Tex. (AAA) Southwest Model Airlane FF, CL & RC Championships. Site: Samuel East Park (FF), Hobby Park (CL & RC). R. Tenny CD. 432 Lynn St., Richardson, Tex. 75080.

Sept. 5-6 — Denver, Colo. (AA) Mile Hi RC Pylon Races. Site: Lowry AFB. H. Geller CD. 6920 E. Exposition, Denver, Colo. 80222. Sponsor: **Mile Hi Radio Control Club.**

Sept. 5-6-7 — Anville, Penn. KRCS Invitational Fly for Fun Meet. Site: Muir Field. K. Reber CD, RD 2, Shippensburg, Penn. 17257. Sponsor: **Keystone RC Society.**

Sept. 5-6-7 — Las Vegas, Nev. (AA) Las Vegas International RC Air Races. Site: Las Vegas Raceways. E. Shipe CD. 729 Falcon Way, Livermore, Calif. 94550.

Sept. 5-6-7 — Memphis, Tenn. (AA) M.R.C.C. Meet. Site: Club Field. L. Hord, Jr. CD. 5050 Poplar, Memphis, Tenn. 38117. Sponsor: **Memphis RC Club.**

Sept. 5-6-7 — Nedrow, N. Y. "ARCS" RC Jamboree. Site: "ARCS" Field. E. Izzo CD. 3950 Highland Ave., Skaneateles, N. Y. 13152. Sponsor: **Aero Radio Club of Syracuse.**

Sept. 5-6-7 — Albuquerque, N. M. FAI FF Team Selection Finals. Site: Boy's Academy. J. Bicknell CD. 12329 Princess Jean, N.E., Albuquerque, N. M. 87112. Sponsor: **South West Aero Team.**

Sept. 6 — Chicago, Ill. (AAA) Annual CL Meet. Site: Forest Preserve. E. Schmidt CD. 4934 W. Winnemac, Chicago, Ill. 60630.

Sept. 6 — Pettyville, W. V. (AA) Sky Sharks RC Fun Fly. Site: Skysharks RC Field. S. Sturm CD. Box 5234, Vienna, W. V. 26101. Sponsor: **Vienna Sky Sharks.**

Sept. 6 — Cahokia, Ill. (AA) McDonnell Fall FF Contest. Site: Parks Air College. J. Gremel CD. 8618 Jo Ct., Berkeley, Mo. 63134. Sponsor: **McDonnell FF Club.**

Sept. 6 — Lexington, Ky. (AAA) Mid-America FF & CL Championships. Site: Lexington Model Airport. L. McFarland CD. P. O. Box 8177, Lexington, Ky. 40503. Sponsor: **Lexington Model Airplane Club.**

Sept. 7 — Middlesex, N. J. (AA) M.M. Inc. Second Annual CL Contest. Site: Mountain View Park. A. Koenig CD. 1613 Frase St., So. Plainfield, N. J. 07080.

Sept. 12-13 — Rhinebeck, N. Y. (AA) World War I RC Jamboree. Site: Olde Rhinebeck Aerodome. D. Buso CD. 11 Maple Ln., Hyde Park, N. Y. 12538. Sponsor: **IBM RC Club.**

Sept. 12-13 — Boise, Idaho (AA) Second Annual BMAA CL Contest. Site: Boise State College. G. Prouty CD. 3117 Redway Rd., Boise, Idaho 83704. Sponsor: **Boise Model Airplane Assn.**

Sept. 12-13 — Dayton, Oh. (AA) Dayton Buzzin' Buzzards CL Jamboree. Site: Municipal Flying Circles J. Martin CD. [redacted] Aberdeen, Dayton, Oh. 45419. Sponsor: **Dayton Buzzin' Buzzards.**

Sept. 12-13 — Atlanta, Ga. (AA) Atlanta RC Air Races. Site: Club Flying Site. R. Roberts, Jr. CD. 2443 Woodside Way, Chamblee, Ga. 30041.

Sept. 12-13 — Shreveport, La. (AA) SHARKS Annual RC Meet. Site: SHARKS International. J. Monk CD. 571 Janel Ln., Shreveport, La. 71106. Sponsor: **Shreveport Area Radio Kontrollers, Inc.**

Sept. 13 — Brighton, Wisc. (AAA) 27th Annual Midwestern FF State Championships. Site: Bong Field. P. Sotich CD. 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: **Chicago Aeronuts.**

Sept. 13 — Wausau, Wisc. Annual Wausau RC Sportsmen Fall Fun Fly. Site: Club Field. K. Sparr CD. P. O. Box 441, Wausau, Wisc. 54401. Sponsor: **Wausau RC Sportsmen.**

Sept. 13 — Columbus, Oh. CORKS 2nd Annual RC Fun Fly. Site: Columbus. E. Tisdial CD. 2657 Lindora Pl., Columbus, Oh. 43227.

Continued on page 83

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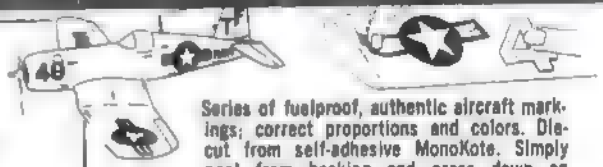

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Jet with Props

Continued from page 29

47D are made at this point.

Careful study of the Boeing photos in the *Profile* revealed that this particular version had a black camber on most of the wing surfaces. The model's wings have already been painted silver. Then, by using pieces or strips of 1/32" striping tape to mask off lines from the leading to the trailing edges, the modeler can easily duplicate the actual plane. Flat black, such as AMT-68 which is actually semi-flat, is carefully sprayed over the masked area. When the 1/32" tape is removed, the silver stripes make a striking contrast. A Moto-Tool and a 1/8" drill bit will make the proper holes where Jato or Rato rockets were used to assist takeoff.

To convert the fuel pod, use an X-acto razor saw to cut the nose piece off about 15 mm back from the leading edge. A second cut is made at the trailing edge at the distance of eight mm. The trailing edge remains as cut, but the tip becomes the spinner which projects from the inside of the leading edge. Using Pactra's Wood (balsa) Filler Putty, build up the area on the leading edge and mount the former leading edge of the tank at the top of this area. One of the sprue trees is cut to make the ventral fairing, with putty or plastic balsa used to shape it to perfection.

The props may be cut from sheet stock styrene or modified from a Monogram Corsair or Thunderbolt prop. The blade length is close to 25 mm and about seven mm across the tip. Serial numbers can be duplicated using Micro Scales number sheets or Letraset's transfer type. Cello-Tak's 3512-3-N was used on this particular plane and worked satisfactorily. Details such as antennas, wheels, outboard wheels, and canopy are all finished using standard techniques.

When this jet with props is complete, the contrast of the black upper wings and the big props on the inboard pods will make this a unique model.

Antoinette

Continued from page 37

used V-8 engines.) The Fox 36X RC used in the model proved to be an excellent engine. The ship weighed approximately nine pounds, but it lifted off with scale realism.

Make the lower portion of cylinders, which includes the exhaust stack, out of 1/4" balsa. Cement these to the top of the dummy crankcase and fill in underside with Hobbypoxy Stuff. The top sections, made from 3/4" dowel, are then cemented in place. Cut five 3/4" ID rings from 1/16" ply for each cylinder. Cut out the dummy heads from 1/4" plywood. Cement the rings (dummy fins) and heads in place on the dowel rods. Cut 1/16 to 1/8" grooves 1/8" apart the full length of the three heads to simulate the head fins. Trim the heads to shape, cut out for glow plug, drill 1/4" holes and screw the glow plugs into the plywood. (They will form their own threads.) Paint the entire dummy engine silver. Make the dummy exhaust pipes from 1/4" dowel rods and epoxy to the sides of the three dummy cylinders.

Referring to the photos and drawings will aid in understanding the above instructions. Cut out the hatch plate and cover with Top-Coat. The dummy engine and crankcase are then fitted and secured to the hatch plate with epoxy. It must fit place over the fuel tank, so the fuel tank, throttle servo and throttle linkage should have been installed previously. After trial-and-error fitting and trimming are complete, secure in place with four small wood screws. Fuel line was used to simulate hoses from the aft end of the dummy crankcase to the forward end of the radiators.

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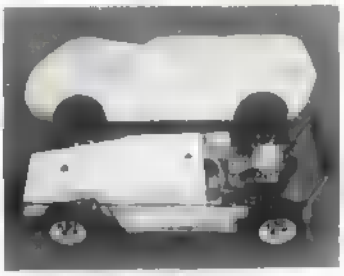

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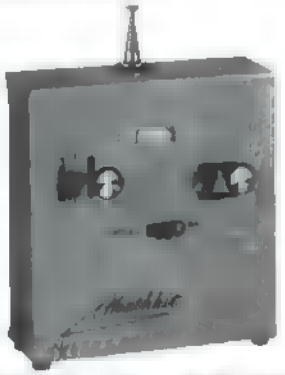

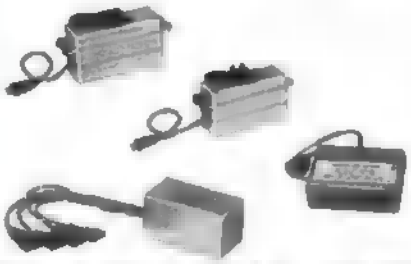

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piece and rounded to shape. Use ¾" dowel for handwheel supports. Drill for ⅛" shaft, then cut into two parts at the bottom edge of the ⅛" hole and cement in place.

The pilot is modified GI Joe doll with a painted set of goggles and an old green stretch sock for flying cap. Run small bead of cement around the face from forehead down the sides to the chin, pull over the sock, secure it with rubber bands and let dry. Then, with X-acto knife, cut away a hole for the face. The tassel was made from strip of green wool rolled into a lump and cemented to the head. Attach goggles and the head is complete. Cement roll of Manila paper (see plans for flat pattern) around the wrists and forearms. Paint hands and paper gloss black.

The wheels are handmade as follows. Draw lines as plans indicate on ¼" plywood. Drill holes for spokes and axles. Cut out wheel and cut away the four center sections. Install axle bushing and check alignment. Permanently attach four spokes each side, using 60-40 solder. Remove wood "X" center section, being careful not disturb bushing or spokes. Install remaining spokes both sides and epoxy at wood rim. Add ¼" balsa outer rings both sides and clamp place with spring-type clothes pins until dry. Insert ⅛" x 3½" bolt through bushing and secure with a nut. Chuck into a hand drill or lathe and, while turning, sand edges of wheel to shape. Stay clear of spokes! Finish area around spokes by hand. Scribe outer surface to simulate tire tread by using a pointed ice pick, jeweler's file, or scribe, etc. Apply three coats of black dope to tire and paint rim silver.

Only the right wing panel is shown. build it first, then turn plans over and build the left panel on the back. Join the panels with the joiners and, when dry, attach rectangular plywood attachment plate with epoxy and four wood screws. The wing will seem flimsy. It will be stronger after silked and doped, but flying wires required, else up to 90 degrees of dihedral will develop in each panel! The wing spikes are made by tapering dowel rods, or brush handles used. These are keyed together inside the wing, as shown, and must be securely anchored because the wing flying wires attached to them.

Four coats of clear dope were used on all silk surfaces to keep down weight and to provide a high-gloss finish. The wing tips made up of a 3/32" balsa rib covered with a 1/16" ply wing-tip skid rib and then a flat tip of ¼" balsa, rounded on the edges. The aileron servo is hidden and protected from castor-oil spray by the scale dummy gas tank. plans are sufficiently detailed for making. The completed assembly must be securely attached to the wing center plate with epoxy and wood screws. Wing rigging wires are not just for looks; they required to keep the wing tips from touching each other above the fuselage after takeoff! Rigging wire tension be checked by "plunking" and listening — the tighter is, the higher pitched the note. (Tune for approximately middle C!) Use tough lightweight black lines or medium dial cord, and prestretch if necessary before installation. In the pit area, point the directly into wind and listen to the constantly changing tune.

Engine Choice: The engine can be any 45 to a Fox 36X or the new Fox . Since weight is needed in the nose, a can be used and throttled back after takeoff for realistic flight. We chose the Fox 36X for the prototype for several reasons: to prove that the Fox 36X could fly a nine-lb. plane; to obtain approximately scale power for realism; and to use a small engine that when the three dummy cylinders added would look like the upright 4 cylinder in-line engine used in the version of the Antoinette. Missile Mist fuel and a 10-6 prop were used to get plenty of rpm at the top end. The engine was set up for a low, quiet idle, and fast throttle servo was used. By "burping" the throttle from full closed to full open to full closed on the landing approach, it sounded somewhat like cutting the original's mags on and off!

Radio: A Bonner 4RS was used for all flights on the Antoinette. Full-house controls seemed necessary since at times aileron control would be desirable even if the ship flew OK with just rudder and elevator. (Those with Bonner 4RS systems probably know that Digimite took over the repair service when Bonner dropped out of RC. Now, however, Larson Electronics, 2289 S. Grand Ave., Santa Ana, Calif. 92705, has the Bonner repair and manufacturing facilities.) The Larson 5RS is improved version of the 4RS and is available with either updated 4RS servos or Orbit type servos. The dummy tank shown on the plans is designed to house the 4RS servo and should be modified as required for other types.

Test Flight: The first test flight of the Antoinette again proved the importance of keeping the CG well forward! Initially, the CG at 40%, and pitch control was difficult, since there wasn't enough pitch stability. The tail and aft fuselage should be kept light and lead added to the nose to get the CG about 33% back from the leading edge. Use downthrust and set the wing and stab level the fuselage top, as shown on the plans. The first flight then should present no difficulty.

First flights should be made in reasonably calm weather with takeoff directly into the wind. Hold some up-elevator as power is slowly applied. It will track well and lift off gently. Smoothly let off most of the up-elevator, continue climbout, make a 360-degree turn around the field and come back over the transmitter, heading directly into the wind. Check hands-off trim and correct if necessary; cut throttle to idle and check glide. Make a traffic pattern approach with final directly into the wind. As the ship goes by, the wind will be playing a tune on the flying wires. Start pulling in up-elevator, so that full up is held just as the wheels touch! The slow, shallow, stable glide and slow landing speed of this model make it more like a glider than a scale or pattern ship.

This the fourth in a series of vintage scale projects by Vern Zundel, who designs and builds the models. When asked how he manages eight original scratch-built scale projects in one year, his only answer so far has been, "I spend most of my spare time on it!" Vern is the originator, promoter and motivating force behind the 60th Anniversary London to Paris Air Race to be held in St. Louis on Sept. 27th. Al Signorino's part in these vintage aircraft projects has been to make the test/trim flights and to do the black and white photography.

They generally make movies of the project test flights, because something unexpected usually occurs. These movies, on regular film, are available for a $5 rental fee to anyone interested in seeing them. Included are the Blackburn, Bristol Brownie, Demoiselle, Antoinette, DH-2, DR-I, RC Autogiro, Snoopy's RC Doghouse, etc. After September 27th, movies of the 60th Anniversary Air Race will also be included. Contact Al Signorino, 11959 Glenvalley Dr., Bridgeton, Mo. 63043 or call 314-739-3456, 3456.

The Sixtieth Anniversary Air Race is limited to RC models of aircraft that flew or theoretically could have flown in the actual or movie version of the 1910 Air Race. This includes aircraft designed and flight-tested, even if unsuccessfully, prior to 1911. Models may be to any scale in size and may be scale or semi-scale in appearance. Proof-of-scale is not required, however, the Proctor Antic kit is about the limit. Operating models of any pre-1911 unsuccessful ma-

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chine may be entered. The model need not fly, but it should act like the original.

The object of the race is not maximum speed. Entrants must qualify by successfully completing two takeoffs and landings and two heats of five laps each, without a forced landing in the "English Channel" during the second five laps. Final placings will be determined by a random selection of a scale speed after all have flown the course. Forced landings will be allowed since they were common in 1910. One exception is that a forced landing in the English Channel (not really water, in this case) during the five laps from Manchester to Paris will be considered an unsuccessful attempt.

The first air heat will start at 2 pm, Sept. 27, 1970, Buder Park, St. Louis, Mo. Details are available from Contest Director Al Signorino.

On the Scene

Continued from page 14

of the major factors that sorts out the winners from the also-rans, and in this context the engine of a power model must receive expert attention to ensure that it is delivering the maximum power of which it is capable. It would be a fair generalization to say that very few contests are won with engines that are in absolutely standard condition, as they were supplied by the manufacturers. Most have been carefully rebuilt either by the contestant himself, if he has the necessary skill, or alternatively by one of the several specialists in this field.

Some of the more able contestants have acquired this necessary skill to rebuild their own engines successfully, but generally their work will have consisted of stripping down a standard engine and rebuilding it in the same form, but with that extra loving care over fits and alignment that makes all the difference between an average and an exceptional engine. However, the specialist engine tuner usually has expensive equipment and a lot of acquired knowledge at his disposal. As a result, he is able to carry out extensive modifications to the basic engine design and construction to realize that extra bit of power which can make all the difference between winning or losing a contest.

Over the past few years two names have come to the forefront of the glow plug engine tuners, Rolf Miebach in Germany and George Aldrich in the United States. Both of these have achieved an enviable reputation for high-class workmanship in their extensive engine rebuilds and now they are successfully marketing the products of their labor.

On a recent visit to the U.S.A., I was privileged to spend a few days with George Aldrich at his home in Texas. As most control line followers are aware, George is best known for his development of the CL stunt model, and his Nobler design is probably the most successful stunt model ever. In recent years, however, George has turned his attention to CL speed contests and, as this is one event in which the engine is the prime factor, George has also been drawn into the engine tuning business, initially rebuilding engines for his own and friends' use.

So successful have his conversions been that demand has mushroomed at a fantastic rate. Last year George took the rather drastic step of going into the engine development business full-time. It is no easy task to try to earn a living out of engine development and tuning, as reworking an engine successfully is basically a time-consuming operation, and it is therefore difficult to market the final product economically. It might seem that the price of a major rework is high, but if one realized the hours of work expended in reworking and testing each unit, then a different view would be taken. In the case of George's reworks, they are without doubt potential contest

winners before they leave his hands, and therefore are a must for serious contestants.

George's custom-built engines have not been confined to CL speed and Rat Race users. In fact, some of his best successes have been in the free flight and radio control fields, but even control line stunt engines are sent to him for tuning. At the time of my visit, George was working on a large batch of Supertigre G.15's for free-flight power enthusiasts. Judging by the well-known names on many of the boxes, most of America's top exponents have been purchasing George's expertise.

These G.15's were being rebuilt for use with Miebach-tuned exhaust systems. The work being carried out consisted basically of: (1) Replacing the standard sleeve and piston with an ABC sleeve and piston. This piston is specially heat-treated by George to stabilize the alloy, and the sleeve has the exhaust port milled to give the extended exhaust timing necessary for tuned pipe use. The cylinder bore is also carefully honed to give the optimum piston fit. (2) Milling out the exhaust and transfer passage in the crankcase. (3) Grinding the crankshaft port and crank web and extending slightly the port timing. (4) Machining the standard cylinder head to take a Cox head insert. (5) Alignment checks, careful assembly, and test.

George has also been very successful with his modifications to the K&B 40 for Pylon race enthusiasts. With these engines the same basic rework pattern is used, but the standard sleeve and piston are retained, though in a much modified form. The alternate port bars in the liner are completely removed, the bore is honed, hard chrome-plated and rehoned. This piston ring is then pinned in the piston to prevent its ends being trapped in the enlarged cylinder ports.

For CL and RC stunt, the modifications normally include careful fitting and attention to the cylinder head and ports, and chroming of the cylinder bore. Quite a large amount of time is also spent on the final test of the unit, and different cylinder heads and head clearances will be used, until absolute maximum power is being delivered by any one unit.

Some idea of the amount of effort expended in this part of the work may be gathered from the fact that after George had rebuilt an ST 29 for Australian speed flier Jack Finneran, he used 24 glow plugs before getting power from the unit, which could then turn a 7 x 11 series 200 Rev-up propeller at 20,400 on 72% nitro. On the basis of this ground rpm George says that the engine should be capable of reaching the upper 170s in a good mono-line speed model.

George has invested a considerable sum of money in new equipment for his workshop, pride of place going to the new Rockwell lathe and a Rockwell mill. However, he also has a vast amount of small equipment, including honing equipment, electronic strobe, and Hasler tachometers, and he is therefore well-equipped for any eventuality. His plans for this year offer two stages of rework at different price levels. Stage I being the normal complete rework but no bench tuning or running tests other than one short test. Stage II will be full-house treatment with the engine fully tested and adjusted to the final degree and all ready for installation in the model.

One cannot help but admire George for the sheer amount of effort that he is expending on his hobby-livelihood. He works into the early hours of almost every morning, and apart from the engine rebuilding business has a number of other projects which at the moment are strictly secret. However, one side of his operations which George wishes to expand is in the field of consultancy. George's knowledge, experience, and expertise are available to manufacturers or individuals for private and confidential development work.

Straight and Level

Continued from page 6

This Week.

On Whitehead Day in Connecticut last August 14, there appeared three people who had known Whitehead. Now, it has been charged by a renowned historian, who really should know better, that ". . . Whitehead never did anything worthwhile in his whole lifetime." Previous opinions of "qualified" historians and Orville Wright stated Whitehead never built an engine that would run. Others that these engines could not run for long periods.

Peter Politi, 82, recalled working at the McKenzie foundry where castings were made for Whitehead. He recalled vividly that Whitehead ran his engines for tests in excess of one hour, and that they ran perfectly at all settings. (In 1908-09.) These are sworn documents. A neighbor of Whitehead testified she was not able to sleep due to long hours of engine testing. Her statements centered on 1900-01.

A Whitehead engine successfully powered Charles Wittemann's flights in 1909. Whitehead engines were advertised, distributed, and sold nationally.

Cecil Steeves' brother (Cecil is close to 80) spoke of the Whitehead flights. He also recalled a visit by the Wright Brothers to Whitehead's shop on Pine Street, *prior* to 1903. This visit was witnessed, and testified to, by Anton Pruckner, Julius Harworth, and Steeves. Pruckner, Whitehead's mechanic, and witness of the flights, has been interviewed by the Smithsonian, Cecil Steeves begged the Connecticut Aeronautical Historical Assoc. to arrange a meeting with a Smithsonian representative. Steeves could have described the 1900 and 1901 flights. He died without this interview on December 26, 1968! But Steeves is on a tape.

In June of 1968 a 92-year-old man who claimed he saw Whitehead fly made interesting statements about locations of the flights. The locations coincided with places named by other witnesses (unknown to him), never before published. Said Frank Lanye, "Don't waste your time coming up here to interview me. I know nothing about airplanes. I didn't even know Whitehead. So please, save yourselves a lot of trouble. I only watched him fly."

Since 1901, the Whitehead case makes strange reading. This present column won't go into these matters in detail, but questions can be properly raised. Why have so many anti-Whitehead opinions been zealously endorsed in high places? Why was a certain historical volume endorsed, which volume was withdrawn after the

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American Aircraft Modeler article of last November? Why have certain files not been inspected by authorities invited to do so? Why did one authority refuse such an invitation twenty years ago, then again in 1963?

Recently retired Assistant Director of Smithsonian National Air and Space Museum, Paul Garber (interviewed Pruckner and Lanye), said, "In my opinion Whitehead is deserving of recognition for having made limited flights in powered aircraft during the period of to along with the Wrights and Santos Dumont. CAHA should be commended and supported for their research interest and should credited for having uncovered his true relationship to history." The word "limited" should be noted, and the general date — which is the year as the Wrights' first flight. Information which supports the 1903 date also supports flights August 14, 1901.

In 1963, the pilots and officers of the 9315th Air Force Reserve Squadron, Stratford, Conn., initiated the first official investigation of the Whitehead affair. Have set out to prove the Whitehead legend myth, their five-year study instead revealed one of the most remarkable stories to come out of history of aviation. Late in 1963, the 9315th was joined in the venture by The Connecticut Aeronautical Historical Association. One wonders if CAHA will deny pressure from high-ups in industry to terminate the Whitehead research?

The two groups gathered Whitehead's full life story, interviewed witnesses. They have old articles, his memorabilia in hardware and early steam engine model, and photographs from the Whitehead family. The Air Force Museum's Research Division stated that Smithsonian investigation of the Whitehead matter would be appropriate. "Regardless, he apparently did fly and thereby became part of the overall story of pioneer aviation in America," stated Royal Frey, Chief, Research Division, of the Air Force Museum. "By doing his record should rightfully come under the purview of the National Air and Space Museum which not limited Air Force history as is the Air Force Museum."

In the summer of 1966, during a visit to Germany by O'Dwyer and Miss Randolph, with Whitehead which had been provided the Smithsonian seven months before, German newspaper seeking confirmation of these visitors, received a cablegram which stated, among other things, that ". . . The Smithsonian has no documents . . . that Whitehead serious inventor and asserted in 1901 the Scientific American magazine that he had made a motor flight of over seven miles . . . The Smithsonian Air Museum is the best and most serious source in this land and long as no data from there the record will doubtless remain with the Wrights."

Perhaps one of the why information Whitehead so slow surface the fact that, unlike the Wrights, he has come attention "out of nowhere." Actually, like the Wrights, he three-dimensional human being, scientifically and mechanically capable, and had been given to equally long research. In 1965 Whitehead's books were found and studied by O'Dwyer. On page 97 of one, along with Whitehead's grease-smudged finger prints (on every page), were found Count D'Esterno's design — 1864 — and D'Esterno's theories as set down by Chanute. Whitehead's No. 21 machine was quite similar and included the drum and rope control described! Whitehead's of variable sweep makes him America's pioneer of the F-111 swing-wing concept.

Ninety-five cents of his every dollar expended on experiments and aircraft. His daughter Rose recently recalled, "The only time we had meat on the table in July when we could go out and sell the blackberries we picked . . . he'd hide colored eggs and teach us to yodel. He loved children. They through his shop every day in search of small cookies and candy he hid every night . . . you cannot know what it has been like all these years to know he was a good and honest man and listen to the world call him farce and all the horrible things they said . . . he had never been bitter over his lack of being recognized, but it hurt when we couldn't afford a stone for his grave."

One can sympathize with the Smithsonian. For years the Langley-Wright debate went unsettled. And, now there is another legitimate contender, Whitehead. One thing is positive: no one will prove he did not fly.

Can hope that the Smithsonian will face up to the Whitehead challenge? This editorial only scratches the surface.

You Said It

Continued from page 12

interest to today's modelers to see the type plans offered to the modelers of 30 years ago. Joe Ott is now 70 years old and still active in the design and engineering field.

If you are curious as to how I am so well-acquainted with this plan and some of its background, check the lower right hand corner of the title block.

I don't know about this particular model, but many of the models two years earlier were built up by an expert modeler by the name of Sid Axelrod!

T. R. Perzentka, Park Ridge, Ill.

Well, well! Tom Perzentka is Mr. Octura. Sid Axelrod, an old free flighter and tool and fixture man for Douglas in WW II, is Mike Schlesinger's partner in Top Flite. As to the Ott plan, it is printed in blue and its details would put to shame many of today's so-called plans. One wonders what ever happened to progress — at least in plans. But we should say some of today's manufacturers have very beautiful plans indeed. — The Publisher

Getting Started in R/C

Continued from page 28

Flaps or retractable landing gear have been operated successfully from switches triggered by the throttle linkage. Flaps are used most often to slow down a plane when landing. Therefore, the switching would put the flaps down when the engine servo moved to (or toward) low speed, and would raise them for high throttle. There are some advantages in being able to lower flaps to different degrees of deflection, and independently of any other controls. This requires a separate control channel in the system, and separate servo in the model.

Retractable landing gear (RLG for short) normally required to be down only when the plane is on the ground; thus, a simple switch on the throttle linkage can handle it. Some RLG's have built-in motors, others require one or more servos to work the gear (a comprehensive survey of current RLG's will appear in the October AAM). Some RLG systems work by air or gas pressure, requiring only ounce or two of pressure on a small valve. Better stunting capability is possible if flaps are operated together with the elevator (from the servo, or from two servos hooked together electrically). The Top Flite RC Nobler (a development pioneered by AAM Editor Ed Sweeney) is a good example of this technique, which has been used for years on control line stunt planes. With sep-

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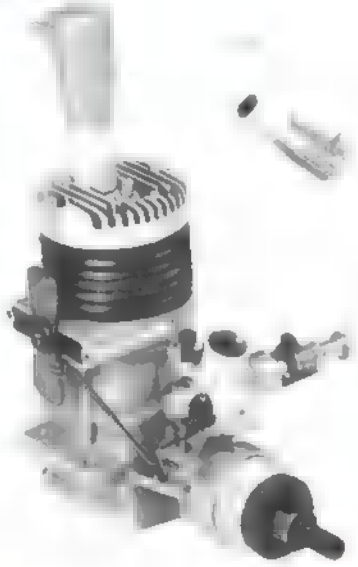

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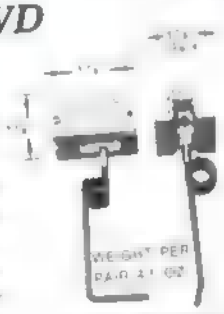

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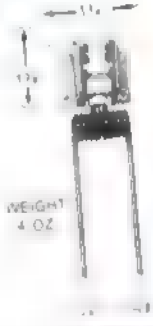

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arate servos it is possible, by special switching arrangements added to the transmitter, to operate flaps and elevators together or separately.

Proportional brakes may be had by use of a special brake amplifier available from a few RC manufacturers. Operated from an auxiliary channel in the system, it gives a complete range of brake control similar to an auto's.

Other auxiliary controls now in use include trimmable needle valves. Many a competition flight has been cut short — and many a sport flight, too — because the engine needle valve was incorrectly adjusted before takeoff. In sport flying, this usually means only a landing to reset the needle valve and another takeoff. In competition, this just can't be done. The ship struggles through the flight with a sick engine as best it can, or until the engine quits entirely.

A special needle valve assembly is required for RC trim purposes, and one or two are now on the market. It is preferable to utilize a separate servo for trimmable NV, although it probably could be handled from one of the normal plane servos. Ingenious modelers have built the trimmable NV addition to the engine themselves. Such a needle valve adjustment doesn't need a wide range — often a half turn is plenty. The needle valve itself must be capable of the regular full range of rotation independent of the trimmable feature.

Dropping bombs or a parachute from a plane in flight can be done without the use of added channels or control channels. Under the fuselage, arrange a pin which may be pulled far enough to release the bomb or the chute when the engine throttle is moved to low. Since this can be done only once each flight, the ship must be landed and the pin reset. By using a separate channel on a propo system, half a dozen bombs or chutes can be dropped by arranging the release pin so it unhooks each time the auxiliary control lever is slowly moved from one extreme to the other.

Tiny rockets have been fired from RC planes in flight. The fuses in such rockets are replaced by tiny heating wires; as the fuses may be ignited by a glow plug heated by an auxiliary battery carried in the model. The setup may be handled from one of the normal plane servos (light a fuse when the throttle servo is moved to low speed, for example) so several could be triggered in succession from an extra channel.

Many operations can be handled from a single auxiliary servo by arranging the output arm to switch a series of electrical contacts over its range. Such operation is useful for RC Scale plane builders, where extra operating features found on the full-sized plane bring added points in competition. For example, a whole series of lights could be handled from one servo — landing lights, wing and other flying lights, cockpit or cabin lights, etc. Digital RC servos operate accurately enough to handle half a dozen sets of electrical contacts. Normally, these would have to be energized in sequence, since no particular one could be selected without energizing those before it in the sequence. However, arrangements could be made to pick any desired circuit with the servo, then have the circuit closed via a separate switch on another servo (it could be operated by the throttle servo at perhaps three-quarters full speed) to give a more versatile setup.

While most of the foregoing discussion applies to model planes, it naturally is adaptable to any other sort of RC model — a boat, for example. On a boat, weight is not important, and neither is space, so a wide variety of extra controls may be accommodated. These can be exceedingly varied and complex. Some fantastic RC boats have been built: battleships and cruisers that can fire dozens of guns; subs that can submerge, fire one or more torpedoes, fire deck guns, flags up and down, etc. RC tanks offer wide scope for varied auxiliary control installations. While multi-control equipment offers the greatest flexibility for such models, a versatile job can be done with just single channel in land and water models, unlike planes where the simpler control systems restrict auxiliary operations rather severely.

Flying Sorcerer

Continued from page 17

the marks. Mark all the pieces before beginning to cut the balsa.

When everything is laid out and all the various pieces have been fitted onto the sheet stock, cut out the pieces with a single-edged razor blade. Check these pieces with those shown in the photo to make sure all the required ones have been cut.

Pin down the plans on a flat board, cover with wax paper, and cement together the four balsa pieces to make the circular wing. While this is drying, the engine mounting can be fixed to the fuselage. Cement the small blocks of balsa to the nose of the body (these blocks can be built up from scrap pieces of ¼" sheet if no block balsa is handy). When the blocks are dry, sand the nose pieces flat and cement on the ⅛" ply engine mount. It is best to leave this to dry overnight.

When both assemblies are thoroughly dry, the wing can be cemented to the body. It's a good idea to draw, with a ballpoint pen, the three lines on the top of the wing. They indicate where the wing is placed on the body and where the fins are located. The fins are be attached now, making certain they are lined up straight before the cement dries. Next, add the remaining pieces of ¼" sheet for the canopy. Suddenly, it's almost finished!

Let everything dry before going over all the edges with sandpaper. The final task is to cement a strip of ordinary gauze bandage to the firewall and around the nose block. This reinforces the engine mount. Use wood screws to mount the engine.

Give the completed model one coat of clear dope and, after this dries, sand lightly and put on one more coat of clear. Sand again, then put on the color dope. Do this very lightly; too much weight will reduce the model's performance. The prototype was sprayed silver and a few decals added to dress it up. The markings also can be applied with colored felt pens.

Check the balance when the model is completed. If it does not balance at the point shown on the plans, add a little modeling clay at either the front or back until it does. Then try a few hand launches into some long grass. A nice smooth glide is required. If it dives too fast, bend the back of the wing up a little. If it stalls, bend the back of the wing down. When it seems about right, attempt a power flight with the engine at low power and the propeller on backwards. If the model climbs to the right, everything is fine; if it flies straight or to the left, put a small washer under each engine mounting screw on the left side. This will make the engine point a little to the right and should make the model climb properly. Glide can be trimmed finally by small adjustments to the back of the wing.

After a few flights at low power, try putting the propeller on the correct way and opening up the engine a little more. The model's performance is excellent, so don't forget to attach your name and address. They may be needed!

BEWARE

The unsuspecting may be zonked by a decal!

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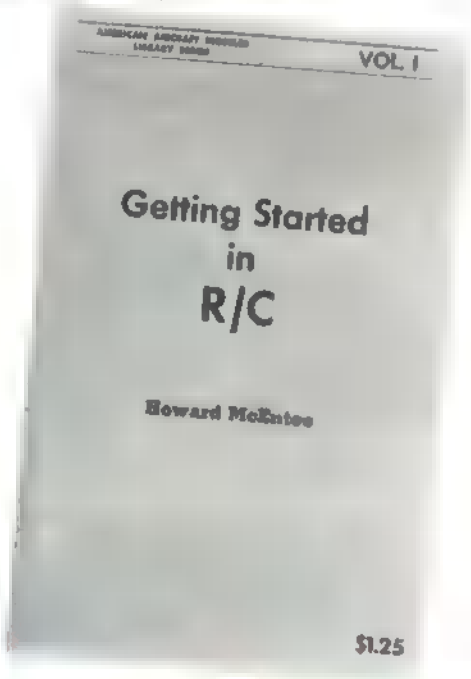

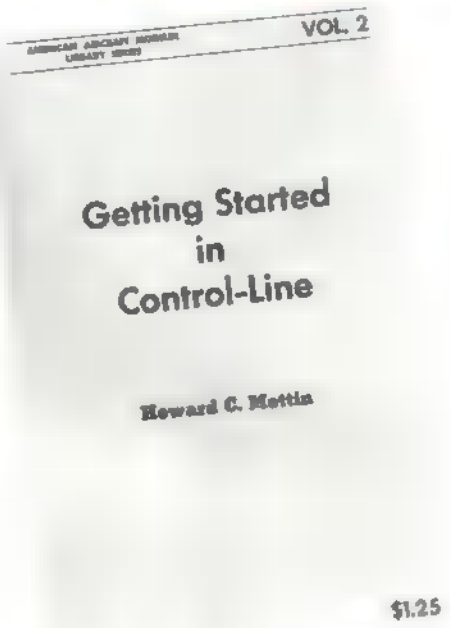

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you have been immortalized [redacted] adhesive . . .

Tenny on F/F

Continued from page 33

plane ("On The Scene," July 1970 AAM). Each club that tried the event immediately planned another contest.

The Chicago Aeronuts will sponsor Pennyplane as [redacted] "extra" event at the 1970 National Model Airplane Championship, using these rules. (1) Model, less rubber motor, must weigh [redacted] least [redacted] much [redacted] a [redacted] U. S. copper penny. (2) Model must not exceed 18" [redacted] length (including propeller) [redacted] wingspan. (3) Motor stick must [redacted] exceed 10" [redacted] length, from front of thrust bearing [redacted] rear hook. (4) Model must use only [redacted] single rubber motor and propeller (no gears). (5) Motor must [redacted] be enclosed [redacted] body [redacted] motor stick. (6) Model must be weighed prior to each official flight.

(7) The scale [redacted] be [redacted] piece of balsa, ⅛" x 1" x 18", with a [redacted] blade pivot in the center. The penny should be glued [redacted] end; the other end projects over [redacted] edge of a table and the model [redacted] hung on the scale. The timer must make [redacted] no weight is removed from the model prior to flying. (8) Standard AMA scoring [redacted] used. . . .

Should Autogyros Have Wings?: For years, indoor autogyros have had [redacted] least some wing area. AMA Rules permit wing area equal to rotor blade [redacted], and most modelers take advantage [redacted] the added performance which results. Recently, several people have expressed the opinion that these designs make little effective use of the rotors, and the wings should be removed. Wingless autogyros do fly quite well, as [redacted] be witnessed in the photo by Fudo Takagi of Bill Hannan's Tyro-Gyro. Although this model is overweight by indoor standards, it makes a sparkling demonstration which is a real crowd pleaser.

Mooney on F/F

Continued from page 33

graphs of them too. Three of [redacted] efforts were made [redacted] plans available from Bill Hannan, a man who has done much to bring the fun back into modeling especially with his contributions to the Tenderfoot series [redacted] AAM!

The first is a Peanut [redacted] of the Waterman Gosling racer, [redacted] by Dave Stott. Barely discernible, the [redacted] plastic propeller gives a clever touch, the wheels are Williams Brothers products. The attitude of the racer is realistic — looks as if a pilot could climb aboard and take off.

The second [redacted] an all-sheet model of an Avro 560 ultralight aircraft, designed by Bill Hannan. Clemins says that it is the lightest of the three. Ribs are indicated by means [redacted] a felt marking pen and the other trim appears to be tissue. A Kaysun plastic propeller is used, and the two-cylinder motorcycle engine of the full-sized machine has been simulated.

Bob's third masterpiece is a model inspired by the movie, *Those Magnificent Men [redacted] Their Flying Machines*. All it lacks is the figure [redacted] Santos Dumont in the seat and [redacted] would really be ready to go. A Peanut Scale model of the Demoiselle, as designed by Walt Mooney, it is the epitome of an antique aircraft. Covering is condenser paper, wheels are clear plastic. The spokes have been simulated by scribed lines. The propeller is plastic and similar to those on the Sleek Streek ready-to-fly models. . . .

Flying Colors: The North American Rockwell Flightmasters paper *Flying Scale News and Views*, lists some interesting new colors: Big Bad B[redacted]e, Tijuana Tan, In Violet, Freudian Gilt, Bring-Em Back Olive, Last Stand Custard, Knight White, Three-Putt Green, There She Blue, Home on the Orange, Thanks Vermillion, and Anti-Establish Mint. Surely one of these colors is exactly right for your next superscale antique eight-engined triplane pusher canard WW-I fighter-bomber model!

Stalick on F/F

Continued from page 33

plenty of reading on both subjects and should check the designs that have won both nationally and internationally. Choose a proved design and build it according to directions. Studying these ships shows that their relative simplicity is outstanding. Hirschel's 1967 A-2 winner was exceptionally functional, with square wing and stab tips; Drew's 1969 Champ, the Lively Lady, featured recently in AAM, is just a shade more complex. Many good published designs are available. The Jetco Talon kit should not be overlooked, although most of the heavy wood should be replaced with contest balsa.

Once a design is selected, build several models, keeping one or two for spares. Then, when the weather breaks, get out and tow them until they become extensions of the arm. Get to know exactly what those gliders will do in all kinds of weather.

Here's a Tip: Save those empty Bic pen ink cartridges. Lightweight and practically non-collapsible, they are great for making curved auto-rudder and DT cable guides. Epoxy cement must be used to fasten them into place. Non-teetotalers can check over their next cocktail straws. Some of them work just as well as the Bic, but have a smaller diameter.

Meuser on F/F

Continued from page 32

test, it's difficult to replace a blade or to straighten a bent propshaft. The gauge shown takes little space in the toolbox, fits a variety of props and noseblocks, and can be built quickly. The propshaft must be square with the face of the noseblock, otherwise cut some wedges to square it up. Put the noseblock in the same orientation in the jig when setting both blades, as it is important that both blades have the *same* pitch, less important that they have a *particular* pitch. Make plenty of 1/16-in. and 1/8-in. shims to accommodate different noseblock widths, and several shims 1/2 in. thick to fit under the slope gauges. A 1:2 slope gauge is probably all that's needed for setting the blades. But, if the gauge also is used to check pitch uniformity along the blades, make a series of them. Find the desired pitch on the left side of the graph, go horizontally to the line for a slope of 1:2, then down to the lower scale showing where to locate the slope gauge. A scale marked on the base aids setting up. Use rubber bands to hold the hub in place. Quick-setting epoxy makes short work of it. For a large graph, send a stamped envelope to the writer, c/o AAM. . . .

Mylar Covering: Those chrome-plated steel models seen occasionally really aren't — they are ordinary models covered with half-mil aluminized Mylar. It is as light as lightly-doped tissue and much tougher although not as tough as MonoKote, and as easy to apply. Shines like crazy in the sun. Obtain from Lou Willis, 1006 E. 12th Ave., Columbus, Ohio 43211. . . .

Anti-Afterburn: Pressurizing the fuel tank, by connecting a tube from the crankcase to the top of the fuel tank, gives more engine power, more consistent running. Many prefer fuel cutoff to fuel floodoff. Some engines are not easily adapted to floodoff, and with high compression diesels there is danger of bending a connecting rod. Unfortunately, the pressurized tank and fuel cutoff don't mix. When the engine starts to cut, fuel froth is pushed into the crankcase through the pressure line, the engine burps, and the flight is declared unofficial. Ray Faulkner solves the problem by installing a liquid-separator in the pressure line — fuel droplets coming from the tank drop to the bottom, dry air goes into the crank-

Reservoir should be blown out after each flight. . .

Help a Kid: Carl Taylor has his own approach to the Juniors Problem. His Stardust-er, powered by an inexpensive McCoy 049, hangs in the local hobby shop with a sign saying that any kid who wants to fly it. Carl takes the kid out, demonstrates the procedure, lets Junior try his hand at any part of it, the whole shebang. If the kid finds it to his liking he can buy the kit and build it, with an assist from the shopkeeper or Carl. No organization, no committees, just a concerned adult and an interested kid. If each of the serious free-flighters in the U.S. converted only one person a year to modeling, and each of those converted one, in ten years the 5000 would grow to five million, and if they each had only one model those ships would stretch wing tip to wing tip from California to New York! . . .

Reducing or Enlarging Plans: A 35 camera and slide projector takes much of the pain out of this usually laborious task. Make a regular color positive slide, mount a black-and-white negative in a standard cardboard slide mount, project it onto drawing paper taped to the wall, trace the lines with a pencil, true them up with a straightedge. Align the camera square with the original plan and the projector square with the drawing paper. A small mirror placed flat at center the plan its projected image aids the procedure. When tried, will become obvious. Build up a file of slides of favorite airfoils — surely beats plotting them. Tilting the projector gives a thinned or thickened airfoil.

Boss on C/L

Continued from page 30

Profile Fuel Tank Tie-Down: F. Tomaschko suggests a use for the plastic strapping material utilized by manufacturers and stores to secure packages for shipment. The plastic material (a sample appears to be nylon) is extremely strong, can be cut with scissors and, when used with an easily-made locking device, makes for a simple, but effective and fuel-proof, tank tie-down. To make straps cut plastic to proper length, and pass strap through small slots cut in the fuselage just above and below the tank to be mounted. The strap can be made long enough to pass around the fuselage. Two straps recommended, on each end of the tank to keep it from tilting. Sketch shows details of lock device. . . .

Stronger Glue Joints: With a little extra effort and time, joints between fuselage sides and bulkheads can be made considerably stronger than is possible with ordinary construction methods. First, drill, or punch small holes in the bulkhead formers where the glue (preferably epoxy) is to be applied. Mark the fuselage sides at the points where the joints are to be made. Apply the glue to the bulkhead formers, making sure the glue gets into the holes. Apply a thin coating of glue to the fuselage sides the marked locations and join together.

When the glue has set, the joint has greater strength because of glue penetration in the bulkhead formers, than the customary flat surface to flat surface joint. For working with very thin formers, cutting or scoring the former edge with a razor blade or X-acto knife serves the same purpose as the holes. The same idea can be used when putting any two pieces of wood together.

Blum on C/L

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(6) tip plates, and (7) MonoKote finish. While not a good choice for AMA stunt model appearance points, it does represent a suitable model for the no-appearance-points philosophy. (It would fit in a Volkswagen, too!). . . .

Carrier History: Carrier developments from 1965 to 1970 have produced more changes than the first 15 years totaled — changes that added refinement, professionalism, and enjoyment to the event. Division of Navy Carrier into two classes determined by engine size and the development of an official Profile event offered more classes (events) and allowed less technical approach for the novice.

Models during this period didn't appear to change much. Guardians dominated the scene, with Maulers, Corsairs, and Bearcats bringing up the rear. Internally, however, innovations were underway! Maximum points, fixed by rules for scale and landing, meant that the now phenomenal over-500 must be achieved in the high and low speed phases by faster engines with pressure and better throttling setup to cope with a pressurized fuel system

slow speed.

These refinements pushed scores steadily over 500 points and beyond. In 1965 and 1966, Class II (.41 cu. in. and above) scores ran 544 and 593, with 588, 552, and 587 in [illegible]. 1968, and 1969. (Class II in both records now over 600 points.) In Class I (up [illegible] and including .41 cu. in.), scores started this new class at 445 in 1965, then jumped to 495, 487, 552 and 553 in the following four years. (Record is now over 585 points.)

K&B and Supertigre engines dominate in Class I, with the Rossi 60 taking Class II. Equipping these high-performance, rear-rotor engines with effective throttles and fuel-metering devices has produced unparalleled performance. Models now are smaller, with some 26" and 28" spans in Class I. Refinements in size, construction, and operating features such as flaps and working ailerons and rudders [illegible], with powerful engines, producing phenomenal results.

In addition, development of two-line, preset throttles, clockwise turning (left-hand) engines to take advantage of engine torque, etc., should produce interesting results at the 1970 Nats. . . .

Profile Carrier Engines: AMA rules specify a maximum engine size of .36 cu. in. with a "production RC-type intake throttle." Engine must be sleeve-bearing type. Plain-bearing Fox 36X RC engines are available from Don Gerber, 2200 N. 11th St., [illegible]eading, Pa., 19604. . . .

Morse on R/C

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in racing have been proposed. Some you may disagree with, while others will seem good ideas. But the all-too-common approach is to not do anything about them. Not many members seem to realize that the NMPRA does carry a lot of weight with the AMA contest board. It might be difficult to hear one lone voice but, speaking together through the NMPRA [illegible] are heard.

Those with concrete proposals for improving the hobby should send them to Gil Horstman, NMPRA, 613 Donner Ave., Las Vegas, Nev. 89107. Constructive ideas will be reviewed by fellow NMPRA members and, if the majority agree, these changes will become official policy. Those who are not NMPRA members may join by enclosing a $6.00 check with their letters.

Siposs on R/C

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be adapted to RC racing. Kenico Electronics (Tampa, Fla.) is opening a new track for cars and has special facilities for beginners. Gordon Brechin (670 Comstock Rd., Richmond, B. C., Canada) is organizing a car club in his area. . . .

One of the biggest RC news events is the announcement that Orbit has a new three-channel radio set designed specifically for cars. A complete technical report on it will appear in AAM soon. The Orbit factory team participates in actual car racing because it has found that only by such field trials can one appreciate the problems that crop up. . . .

Engine Starter: To start the engine, many hobbyists use upturned bicycles [illegible] electric-motor-driven V-belts and even rubber-faced wheels mounted on a handgrinder. Robert Kelly has built [illegible] electric starter using a lawnmower starter motor. The battery also powers the glowplug (via a resistor), and in this circuit an ammeter indicates the current being used. The reading (assuming a constant voltage) also is indicative of the needle valve setting during starting. If the needle is set too rich, the reading goes up because the fuel cools the glowplug wire, thus lowering its resistance. An elegant way to set the fuel mixture. . . .

McEntee on R/C

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the U.S. representative at the Fall CIAM meeting will suggest holding the 1973 Stunt RC affair in the U.S. . . .

First ECSS Meet: The 1970 schedule of four meets by participating clubs got underway at Old Dupont Airport, near Wilmington, Del. Sponsors for this opener were members of Delaware RCC. The weather was ideal — quite hot but with modest thermals. The 26 entrants had three flights each in two events; the main differences between these events were the length of towline, the length of flight, and the time allowed to get back to the ground.

The first event, run by modified FAI rules, used 300-meter Hi-Start or winch lines, a 15-min. flight max, and three min. to get back to ground after a max. Top winners were Joe Roslyn, Dick Sarpolus, and Walt Good. The afternoon event went by straight FAI rules, calling for 150-meter lines, a 5-min. flight max with one added minute to get to earth. Spot-landing points were given in each event. A tie for first developed, and a flyoff gave top place to Bill Gottorf, while Gus Geissinger (who was CD of the meet) dropped to second and H. McEntee was third. Several maxes were scored in each event, there being more in FAI due to shorter flight time and possibly a little greater thermal activity. Four gliders used "thermal sniffers," but only two helped their owners to higher places (Good in Mod.-FAI; Don Clark, fifth in same event).

Considerable glider variety was seen, with many originals. Four Graupner Cirrus kit jobs were flown by Geissinger, Good, McEntee, and one other pilot. Each flier had three tries in each event. Five power winches were in use (three gasoline and two electric) and Hi-Starts also were available. Practically all flights were made from the winches. In the FAI event, several pilots utilized the hand-tow system. With the relatively short line allowed here, hand towing appears to get a model higher than either a winch or Hi-Start, provided the man on the business end of the towline knows his stuff — and can stand the gaff. . . .

Marks on R/C

Continued from page

reliability of airborne battery packs. This point was brought home with shattering impact at the very next flying session involving tests of a Blue Ribbon Review set. This is worth describing in detail because of the outstanding response by the manufacturer of the set and the heart-stopping implication of the accident. It also is a response to number of club newsletters — manufacturers seem to appreciate that frankness.

The review set was being test flown in an RC Nobler. The first flight was totally uneventful. During the second flight, the set went dead. The airplane continued to fly for about 30 seconds before crashing into a pole not far from children at play. This occurred with a well-tested airplane, a brand new set, and an expert pilot. Remember, any system by any manufacturer or home builder can quit at any time. Don't take chances and always fight the temptation to show off; it could be fatal.

The set was returned immediately to the manufacturer, Mr. Jim Fosgate, with a letter saying the review could not start until a satisfactory explanation for the failure was presented. His response was most gratifying. One cell in the airborne battery pack had opened, killing all power. Not only did he explain the failure, he presented an outstanding engineering correction. Jim especially requested that credit be given to Ray Pisar of R. C. Engineering (Phoenix, Ariz.) for the idea used.

The set designed by Jim uses a bridge amplifier for the servos, thus the battery pack is a two-wire harness. This means there is no center tap. By the simple insertion of a low forward drop, high-reverse drop silicon diode in parallel with each cell, the set will continue to work with one cell open. Figure 1 presents wiring and schematic, and Figure 2 presents a P.C. layout for a permanent arrangement. Attach the P.C. board to the battery pack using Silastic. Because of the extremely high reverse drop of the diode, there is no discharge of the cell beyond that normally encountered with self-discharge. Because of the low forward drop (about 0.6V), servo travel rate is reduced by perhaps just 25 percent or so. Incidentally, the same idea could be used in a transmitter battery pack.

The next question was what would happen when this arrangement was applied to the normal center-tapped battery pack.

When this was attempted, it was found that the one set tested would not perform properly because the receiver is not designed to operate at the voltage level present: 4.8 volts less one cell and less the forward drop of the diode (0.6V) or 3.0 volts. This should not be an insurmountable barrier to use of the arrangement on any system because the receiver can be designed to function on a regulated 3.0 volts or less. Center-tap servos will be considerably slower in the direction of the dead cell but should remain functional. Research in this area will be continued and results reported. . . .

In Reply: Frank Williams asks, "If a transmitter designed for 9 volts dry cell operation is converted to nickel cadmium batteries, should seven cells be used for 8.4 volts or will damage result if eight cells for 9.6 volts are used in view of the voltage at full charge of 1.4 volts per cell? Second, do you feel that the amp-gate charger is detrimental to the life of nickel cadmium batteries?"

The full charge voltage of an eight cell pack is 1.4 x 8 or 11.2V. The normal dry cell will run somewhat over 9.0V when fresh. Normally, a transmitter will not be harmed by application of 11.2V. If it is, the design was marginal at 9V!

Evidence of the effects of an amp-gate charger is difficult to come by in an objective form. The amp-gate charger applies a current well in excess of the normal ten-hour rate until the cell reaches the nominal 1.4V level, then reduces the current instantaneously to a very low level. The arrangement is rather complicated since charging must be done for individual cells, i.e., an amp-gate diode is required for each cell. They cannot be charged in series because not all cells will reach the proper level at the same time. Any overcharge at the high rate will certainly result in some cell damage. Intuitively, I feel that amp-gate charging, even if properly done, will ultimately result in some reduction of the number of times a cell may be cycled. I do not feel that use of an amp-gate charger is justified for radio control systems because of these potential problems. . . .

Rechargeable Batteries: At a recent IEEE show, a new approach in rechargeable batteries was presented that permits full recharge of cells in as little as 90 seconds from another, heavier, battery. This would permit the use of a small, light, pack which is field rechargeable from the automobile battery. It is not based on amp-gate charging but rather on application of heavy pulses of charging current, followed by a much shorter pulse of reverse charge which eliminates gassing. Little more information is available at this time, but the approach will be described fully in the near future.

Lowe on R/C

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vibration! We have heard of this engine for some time now without realizing its availability. The same is true of another vibration solution — the twin, which is now slowly emerging as an available item.

Contact with World Engines indicates that the primary deterrent to availability of the Graupner/O.S. Wankel in this country has been a patent problem with Curtiss-Wright who has the patent rights to the Wankel engine design. I am informed that contract negotiations between the interested parties, Graupner, O.S., W. E. and Curtiss-Wright are now being finalized. W. E. is expected to be the agent in this country for the Graupner/O.S. Wankel. The engine is available in Japan and Europe for those fortunate enough to have contacts in those countries.

John Kiker has written about his experience with the Wankel engine. John, who works for NASA on Apollo recovery systems, was able to combine pleasure with

business last year and visited the Graupner plant. He was ... impressed with the facility, calling it the most modern that he visited while in Germany. He ... able, with the help ... Mr. Graupner, to ... an a Wankel engine through a hobby shop ... Braunschweig, Germany. This was ... the first engines available there. John has been flying the engine ... September, 1969, and reports his findings. The engine ... 30 ... in. displacement and weighs 13 ..., with the mounting plate and 10/4 Graupner prop supplied. Graupner recommends a maximum of 10% nitro fuel, but John finds it runs best with zero nitro. This should be a real saving in fuel costs. He tached it, using a Heathkit tach., at 12,000 top end and a good safe idle of 3000 rpm. Vibration is extremely low and throttle response and control is excellent. The engine does not have the sharp crack of an ordinary engine. It's ... a muffled ... Starting proved to be easy after John learned to prime the exhaust and carburetor. Hard flipping ... required to get the engine to rotate through 360 degrees. A starter helps. John reports that the engine hauls a deBolt Jenny with ease through all maneuvers, and sounds as though ... has a muffler.

John concludes that the engine is heavy for its displacement, although it ... to have more power than a conventional ... It is expensive and costs about sixty U.S. dollars in Germany. It has excellent handling and running characteristics and ... a crowd-pleaser wherever he flies. John sent along the engine manual which was "very interesting," especially since I never learned to speak or read German. . . .

On the Subject of Engines: People often ask why my engines ... to ... well, produce good power and last so long. The answer to the latter is to always run the engine ... the rich side. Never allow it to ... dead lean for ... extended period. It really tears my soul to see ... modeler tweak the needle valve until the engine just breaks into two-cycle, and then leans it some more. That's the quickest way to the engine graveyard.

Being ... lazy modeler, my engines are never broken in. These modern ringed RC engines are marvelous pieces of machinery and will really respond to reasonable care. Two brand new O.S. Max 60's I installed recently had not been disassembled or run before; yet they started ... the second flip after priming and ran like demons for many flights — with the needle set on the rich side. Incidentally, this is some engine with a tremendous improvement in power over earlier models! It's right in there with the Tigres, Enyas, Webras and all of the improved 60's. . . .

For those who like that something extra, how about flaps? Many versions have been seen ... but none more professional than that offered by R. M. Valentine. The Valentine Fowler flap mechanism should not be difficult to duplicate from the sketches shown.

McCullough on R/C

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trol lever on the transmitter is pumped back and forth until the gear is up. Return ... lockdown is by gravity, aided by all those wheels.

Wing joints, cowls, and fittings needed reinforcement to withstand the fantastic vibration produced by the massed one-lungers. A problem with the crankcase front face wearing away from the pressure of the drive washer being shoved against it by the thrust of the pusher prop was solved by inserting a thin steel shim between them. After individual pre-tuning, all six engines are running in less than two minutes with an electric starter, way under the total allowed time of 13 minutes. Hand-starting of the full complement is nearly impossible. The ear-splitting din hinders concentration and the closely spaced Tornado left-handed nylons can draw blood. . . .

The Incredible Shrunken Airplane: When former Percival Aircraft chief engineer Sid Holloway took up RC scale he applied some of his full-size techniques. The result, a ¼ ... Beagle Pup 100, made from .0125 and .010 handworked aluminum, is a staggering work of art. Authentic structure built from factory drawings is assembled with epoxy and rivets. Landing gear has rubber compression springing. O.S. Max 60H ... on an anti-vibration mount. Weight is 9.6 lb. Test flights have shown the ship to be a slow and steady performer. Complete cockpit detail is being added. Roy Yates says that this gem will be ... static display during the World Scale Champs at Cranfield, England. Sid has wisely decided not to risk two years of building effort until he has more RC flying time. When the Pup goes into competition ... 1971 the rest of us may have to consider stamp collecting — or try to top it. . . .

Hot Tip: Maxey Hester has found a new use for Kavan's control surface fairing. The plastic half-round section makes an excellent simulation of a steel tubing wing tip on a fabric-covered wing. The plastic is bent cold and pinned in place on the plan. Holding a heat lamp or hair drier close will heat form it to permanent shape. Sands easily to fit where it joins the rest of the structure. Several different sizes available.

Propose Size Changes: The Scale Committee of the SMAE in England has suggested to the FAI that the weight limits for RC scale of 11 lb. be raised to 13 lb. and the top engine displacement from 61 to ... American sentiment seems to be in favor of an even larger jump to the AMA figures of 15 lb. and 1.25 cu. in. Over several years these limits have proved to be safe and practical.

AMA Contest Calendar

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Sept. 13 — Mentor, Oh. MARCS (A Midget RC Pylon Race. Site: Club Field. F. Vidmar CD. Zeman Ave., Euclid, Oh. 44132.

Sept. 13 — Queens, N. Y. (AA) Queens Stunt Masters Second Annual CL Meet. Site: Flushing Meadow Park. V. Macaluso CD. 384 Central Islip Blvd., Lake Rodkonkoma, N. Y. 11779.

Sept. 13 — Alton, Ill. (AAA) Illinois Metro-East CL Meet. Site: Civic Memorial Airport. J. Blum CD. 2417 Glen Pl., Granite City, Ill 62040 Sponsor: Tri-City Sky Steelers.

Sept. 13 — Fort Wayne, Ind. (AA) Flying Circuits 15th Annual Mid-State RC Contest. Site: Smith Airport. J. Smith CD. 2925 Ridgeway Dr., Fort Wayne, Ind. 46806. Sponsor: Flying Circuits RC Club.

Sept. 13 — Ohio City, Oh. (A) Club RC Contest. Site: Club Field. D. Kraner CD. RR 1, Ohio City, Oh. 1587). Sponsor: SHOO Flyers MAC, Inc.

Sept. 13 — Sacramento, Calif. (AA) Northern Calif. FF Council Meet. Site: Condors Field (Weagel Field). B. Vanderbeek CD. 830 Ashton Ave., Palo Alto, Calif. 94306. Sponsor: 800 Club.

Sept. 13 — Portland, Ore. (AA) Falcon Invitational CL Meet. Site: Delta Park. V. Matheny CD. 75 N.E. Going, Portland, Ore. 97211. Sponsor: Falcons.

Sept. 19-20 — Tullahoma, Tenn. (AA) Tennessee Valley RC 1st Annual RC Meet. Site: Coffee Air-Foilers Field. J. Wyatt CD. 502 Young Ave., Chattanooga, Tenn. 37405. Sponsor: Tennessee Valley Radio Control Club.

Sept. 19-20 — Indianapolis, Ind. (AA) 2nd Annual Indy RC Meet. Site: 30th & Post Rd. J. Goad CD. 10306 Willowmere, Indianapolis, Ind. Sponsor: Indianapolis Radio Control Club.

Sept. 19-20 — So. El Monte, Calif. (AA) Southern Calif. RC Air Races. Site: Whittier Narrows. J. Garabidian CD. 909 N. 3rd St., Montebello, Calif. 90640. Sponsor: San Gabriel Valley RC.

Sept. 20 — Valley Park, Mo. (AA) Hot Heads 13th Annual CL Airplane Contest. Site: Buder Park Flying Field. A. Biehl CD. 2105 Bienville Dr., Florissant, Mo. 63031. Sponsor: Hot Heads MAC.

Sept. 20 — Lockport, N. Y. (AA) United RC Pylon Circuit Meet. Site: Niagra County Model Airport. H. DeBolt CD. 3833 Harlem Rd., Buffalo, N. Y. 14215.

Sept. 20 — Denver, Colo. (AA) Model Museum 8th Annual Fall FF Old Timers Events. Site: East Colfax Air Park. H. Elmore CD. 3626 Geneva St., Aurora, Colo. 80010. Sponsor: Model Museum Flying Club.

Sept. 20 — Plymouth, Mass. (AA) Balsa Bugs FL Contest. Site: Plymouth-Carver High School. L. Winzburger CD. 92 Nicks Rock Rd., Plymouth, Mass. 02360. Sponsor: North Plymouth Balsa Bugs.

Sept. 20 — New York, N. Y. (AA) Assoc. of M.A.C. of Great N. Y. CL Meet. Site: Flushing Meadow Park — Flying Field. J. Conlon, Sr. CD. 89-09 247 St., Bellrose, N. Y. 11426.

Sept. 20 — Hastings, Minn. (AA) Annual Little FF Internationals. Site: Webers Airstrip. W. Anderson CD. 300 Park Ave., Apt. 3. Elk River, Minn. 55330. Sponsor: Minneapolis Model Aero Club.

Sept. 20 — Frederick, Md. (AAA) 1970 Maryland FF, CL, RC Model Airplane Meet. Site: Frederick Municipal Airport. J. Patton CD. Route 5, Frederick, Md. 21701. Sponsor: Frederick MAC, Inc., Baltimore Aero Craftsmen, & RC Modelers of Baltimore.

Sept. 20 — Warren, Oh. T.C.R.C. 3rd Annual RC Fun-Fly. Site: Club Field. R. Plant CD. 550 Freeman St., Warren, Oh. 44483. Sponsor: Trumbull County RC Modelers.

Sept. 20 — Garden City, N. Y. (AA) L.I.D.S. Annual RC Contest. Site: Mitchell Field. Fuori CD. 28 Fernwood Dr., Commack, N. Y. 11725. Sponsor: Long Island Drone Society.

Sept. 26-27 — Huntsville, Ala. (AA) 1st All South all Scale FF, CL, RC Meet. Site: Old Huntsville Airport. A. Wilson CD. 1401 Glenwood Dr., S.E. Huntsville, Ala. 35801. Sponsor: Huntsville Aeromodelers.

Sept. 26-27 — Fresno, Calif. (AA) Fresno's Annual FF Contest. Site: Near Kerman, Calif. E. Gallo CD. 1725 Kenmore Dr., W., Fresno, Calif. 93703 Sponsor: Fresno Gas Model Club.

Sept. 26-27 — W. Suffield, Conn. (AA) 6th Annual NCRCC RC Contest. Site: NCRCC Field, R. Bernier CD. 761 Mather St., Suffield, Conn. 06078. Sponsor: Northern Conn. RC Club.

Sept. 26-27 — Denver, Colo. (AAA) Annual Rocky Mtn. FF Championships. Site: East Colfax Air Park. T. Daniels CD. 1265 Yates St., Denver, Colo. 80204. Sponsor: Magnificent Mountain Men.

Sept. 27 — Brighton, Wisc. (AA) 8th Annual Chicago Aeronuts Fall FF Old Timers Contest. Site: Field. P. Sotich CD. West Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeronuts.

Sept. 27 — Tex. (AA) CMC Fall FF Bash. Site: Preston Rd., N. Wilder CD. 2010 Boston, Irving, Tex. 75060. Sponsor: Cliff Cloud Climbers of Texas.

Sept. 27 — Valley Park, Mo. Anniversary Air Races for Special Scale events. Site: Buder Park. A. Signorino CD. 11959 Glenvalley Dr., Bridgeton, Mo. 63043. Sponsor: Greater St. Louis Modeling Association.

Sept. 27 — Dover, Del. (AA) East Coast RC Glider Championship. Site: J. Allen Frean School. L. Messick CD. Brian Ln., Dover, Del. 19901. Sponsor: Dover Mosquitoes.

Sept. 27 — Lafayette, Ind. (AA) Lafayette C-J Annual CL & RC Fall Fly-In. Site: Market Square Shopping Center. R. Ramsey, Jr. CD. 223 Main, Lafayette, Ind. 47901.

Air Force Museum

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tieth century attempts at flight. Almost every major contributor is represented, including such greats as Langley and Lilienthal.

The pre-WW I era is represented by a 1909 Wright Military Flier, an exact replica of the original stored in the Smithsonian, and the Wright Model B. The 1909 Model B is modified; it has ailerons and a wheel-control system instead of the original wing warping device. This particular aircraft was flown until 1934, when it was retired.

The section devoted to WW I contains several classic aircraft, nearly nonexistent. Included are a Curtiss JN-4D Jenny, a Thomas-Morse B Scout, and a Standard E-1. This section is notable for the modeler in that it represents nearly all phases of the air war.

The next section represents the 1920-30 era during which aviation made many of its greatest advancements. The D H 4 is the first aircraft in the exhibit and one of many aircraft which began commercial routes to the major cities. The second exhibit, Douglas World Cruiser "New Orleans," made history circling the globe in 1925 with three other craft. These aircraft, quite large for their type, were typical of the final years of biplane design. The dramatic change-over from biplane to monoplane is illustrated by a line-up of Army Corps aircraft, all beautifully restored and painted in authentic color schemes. The two outstanding are a P-6 E Hawk, and a P-26.

The most outstanding exhibit in the Air Force Museum is the WW II display. It contains approximately 24 aircraft, representing every phase of the fighting, as well as a section devoted to trainers. Recognizing the importance of training aircraft, the Museum has included the PT-19, the PT-13

and the BT-13. No trainer would be authentic in anything but the classic blue and yellow, so all of the planes have this color scheme.

The fighters formed what was perhaps the most interesting division of the air war. Every imaginable design theory was tested in combat, and the most reputable are displayed. The list includes a P-36, P-40, P-47, FW-190D, Spitfire, and P-51. The P-36 is the not-too-well-known predecessor of the P-40. It performed most of its feats while serving in Europe during the earlier parts of WW II, and was also used against the Japanese at Pearl Harbor. The Museum's P-36 served with the 37th Pursuit Squadron, and is painted in the popular "sand and spinach" color scheme. The other of the Curtiss fighters, the P-40, is probably best known for its exploits over China and Japan while in the hands of the famous Flying Tigers. Like the P-36, it was also at Pearl Harbor, but many P-40's were destroyed on the ground by low-level Japanese bombing. This P-40 is in the colors of the Flying Tiger group.

Few men who served in the war will forget the P-47. The infamous "Jug" is remembered for its speed, firepower, and massive appearance. It was designed around the Pratt and Whitney R-2800 Double Wasp engine, which gave it its stubby appearance. The Museum's plane, a P-47 D, has a turtle-deck behind the cockpit. It is painted in the standard green and gray camouflage pattern.

Although the majority of the Museum's aircraft are American, there are a few examples of German and Japanese war planes. One of these is an FW 190-D, which was captured. The 190-D was modified to take a Jumo 213 in-line engine while retaining a circular cowling. The aircraft on display is in the colors of the JG 3 Unit, one of the Luftwaffe's most famous fighter groups.

No display on WW II aircraft would be complete without at least one example of a RAF fighter, so the museum has a Supermarine Spitfire. The Spitfire's greatest role was in the Battle of Britain, when it managed to repel Hitler's Luftwaffe. In this battle, most Spitfires saw action several times daily, every day for over a month. Only a machine of superior construction and design could have withstood this punishment, a great testimony to its creators. The Museum acquired the Spitfire from the RAF in 1958.

If it were necessary to decide which fighter was the most useful and dependable of the war, few would disagree that the P-51 was it. Hardly any plane was faster, a fact that made the Mustang one of the great fighters. The plane on display, the "Sharp Shooter," is thought to be the last prop-driven fighter used in active operation.

The other division of WW II fighting, the bombers, was utilized to destroy the Axis war machine. The number of WW II bombing aircraft at the Air Force Museum is so large that individual descriptions would be too lengthy, but they include: the Boeing B-17, Junkers JU-88, North American B-25, Consolidated B-25, Martin B-26, Douglas A-26 C, and the Boeing B-29.

A great variety of aircraft represents the post-WW II era. The jet age is typified by a B-1, P-39 Aircomet, and several jets of the Korean war; two F-86's, a MiG-15, an F-89, and a P-80. Helicopters are represented by a Sikorsky R-4, YH-5A, a Bell UH-13 J, and a Vertol CH-21B.

The present era of military aviation is well-represented by two SAC aircraft, a few modern jet interceptors, and a NASA experimental bomber. The planes are a B-36 and B-47, F-100, F-106, and the XB-70 Valkyrie. The Museum has almost a complete collection of experimental aircraft, from an X-1 B to an X-13 Vertajet.

The Museum is also totally devoted to aircraft. Among its other exhibits are several small wind tunnels, numerous engines, POW items from WW II, an art gallery specifically devoted to airplanes, and personal effects of many famous airmen. For example, there are the trombone played by Glen Miller, the band leader who died in a plane crash in WW II; and parts of the "Lady Be Good," the famous B-24 bomber which was lost on a mission in WW II and later discovered in the Libyan desert in May 1954. The nose and main wheels of a Barling Bomber are on display, as well as a Gemini capsule. These exhibits make the Air Force Museum an interesting place for the entire family.

Great Lakes Trainer

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chief designer. It sported wheel fairings, an enclosed front cockpit and wrap-around windshield for the rear cockpit, and a clean-up engine cowling.

Other modifications tried on production airplanes included a full canopy covering both cockpits, which was fitted to a ski-equipped winter version of the 2T-1A, as well as one example which had twin floats and an enlarged fin and rudder.

Best known of the pre-war Great Lakes was the "Big Tail" 2T-1A which was beefed up for aerobatics and then equipped with a supercharged 150-hp Menasco C4S engine for stunt pilot Tex Rankin. Extra maneuverable because of its four ailerons, it appeared at hundreds of air shows all through the 1930's.

After World War II, those Great Lakes Trainers remaining became in great demand as pilots discovered that by replacing the none-too-dependable Cirrus engines with more trustworthy and more powerful Warner Scarab and Super Scarab radials of 145-185 hp, or with a variety of horizontally opposed engines, a first class aerobatic airplane resulted. Those of Hal Krier and Bob Nance are among the best known of the Warner versions, while of equally great fame was the 200-hp Ranger in-line special used in the Gold Coast Air Shows by the late Clyde Parsons.

Of some 200 Great Lakes Trainers built between 1929 and 1932, about 50 are still in existence. Most have been modified to use newer engines, but are nevertheless highly prized by antique airplane enthusiasts, with at least one showing up at any gathering of lovers of old biplanes.

Hawker Typhoon

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fault: they depend on humans to operate them. As long as this is true, the end result will be the same. Second, many people disagree with appearance points. Some want to halve their values; others want to double them. I feel increasing these values emphasizes them too much. If values are decreased, too many people will be content with a kit, because realism and originality wouldn't be enough to work for. If anything, I'd like to see a fifth category for general appearance. The total point value would remain at 40, with each category being worth three to eight points. Third, I don't favor iron-on finishes, but I do feel that if a builder does a nice job of putting one on, he deserves credit.

A problem which has plagued stunt models for years is that nasty little word, weight! The general consensus is to avoid using hard balsa and hope for the best. We, and there are five of us here who build and fly stunt, have discovered a new method which allows us to build airplanes with fully-sheeted wings as light or lighter than the conventional "open-bay" configuration. Unfortunately, this technique was not used in the Typhoon because I had not realized its potential. My model is 48 oz., four or five oz. heavier than it could have been.

refer to the idea of using a gram scale in the selection of the wood. A sheet of 1/16 x 3 x 36" should weigh less than ten grams. The difference between 10 and 14 grams may not sound like much, but if four grams are saved per sheet on the ten pieces of wood needed to sheet the wing, 40 grams or roughly one and a half oz. are eliminated in the sheeting alone! Apply this to the ribs, spars, tips, and flaps, and two and a half to three oz. are saved just in the wing. The fact that stunt planes are already overbuilt allows this to be used to a weight-saving advantage. Hard, heavy wood need not be used in building the fuselage. Light wood in the tail section cuts down on ballast needed in the nose. The three or four, or even five, oz. are the difference between an average airplane and an excellent competition stunt ship! Listed is a table of weights which should help in the selection of light balsa. This chart gives the approximate weight for 36-in. lengths.

Lighter wood would be great; but avoid using wood heavier than this. With light wood, you are halfway home. Sensible techniques in gluing add to weight savings. Use only enough glue to hold the joint, not the world. The joint is only as strong as the wood. In areas which have to endure severe strains, use epoxy.

Construction

Since it is the heart of the airplane, begin with the wing. Its construction is different but simple. The 1/16 x 1/4" pieces help line up the ribs and are cut with a Woodruff keycutter in a drill press set at the proper height. This allows the wing to be built in a jig, which helps prevent building warps into it. Begin by cutting notches about 1/16" deep into the leading and trailing edges. The ribs are made by cutting the center and the end rib templates out of 1/16" plywood. Sandwich 13 pieces of 1/16" medium soft balsa between them for each wing. Carve and sand them and then repeat the procedure for the other wing.

Cut the notches for the leading and trailing edges and for the spar; hollow as shown. Use the front of the rib templates for making the half-ribs. These will be cut to length later. Cut the spar out of medium to soft 1/16" sheet, making sure that the outboard spar is one inch shorter. The ribs are then slipped onto the spar. On a large flat board, the leading and trailing edges then are blocked up high enough to clear the ribs.

Cut the bellcrank floor out of 1/8" five-ply plywood. Slide the ribs and spar into the jig and slide the bellcrank floor into the spars. Line up the ribs and glue them into place. Cut an opening large enough for the bellcrank in the spar. Epoxy 1/8" plywood doublers onto the bellcrank floor. Drill the hole and install the bellcrank with a 3/32" pushrod. Install a second platform to help carry the load. Sand down the leading and trailing edges until they match the airfoil.

Cut the landing gear platform out of 1/8" plywood. Bend the landing gear out of 1/8" wire and tie it to the platforms with J-bolts. Install the platforms and reinforce the ribs and spar with 1/8" balsa. Cut and install the half ribs. Sand the entire structure.

Now to sheet the wing. Cut all the edges using a straightedge to insure a close fit. Pin the trailing edge down on the board with the landing gear hanging over the edge. The first sheet is four in. wide and can be full length on the trailing edge. The next sheet is six in. wide and must be joined in the middle. This still leaves part of the leading edge uncovered. Cover it and repeat the procedure on the bottom. Allow to dry thoroughly.

Cut out the flaps. Cut, notch, and drill hole for Top Flite radio control horn. Carve flaps and assemble them. Cut wing tip cores out of 3/8" soft balsa. Cut the top and bottom blocks out of 1/4" soft and spot glue them together. Locate and drill leadout positions.

Sand the flaps flat and spot glue them to the wing. Carve and sand to shape, then remove. Hollow tips, add leadout tubes, three-quarters to one oz. of wing tip weight. Assemble and glue to the wing. Hinge the flaps; add and carve the stationary flap. Glue the $\frac{3}{8} \times \frac{3}{8}$" triangular cap to the leading edge and sand the entire wing.

The stab and elevator are cut out of $\frac{3}{8}$" soft balsa. Carve to shape, leaving the area in the center of the elevator one-in. wide, flat and square. Install the control horn and hinges.

Cut the outline of the fuselage from $\frac{3}{16}$" soft balsa sheet. Using the wing, make a template of the airfoil. Mark the center of the leading edge and trailing edge on it for cutting out the hole for the wing.

Cut out the motor mounts and taper and drill them as shown. Epoxy these to the body sides. Cut out the two plywood bulkheads. I used a World Engines' four-oz. stunt tank with a stock venting. It ran well, but was long for the seven-minute FAI Pattern. However, for the regular AMA Pattern, it is excellent. Epoxy the tank and the bulkheads to the inside (left) body side. When this has set, make a jig for holding the fuselage together and in line during assembly.

Epoxy the front-end assembly to the right (outside) body side and slide the whole thing into the jig. Pull the back of the body together and glue it around the $\frac{1}{8}$" spacer. Add the bulkheads, which were cut from $\frac{1}{8}$" balsa. Cut out the small part of the body by the trailing edge. Block up the wing in the jig so that when it is glued in, it won't be cocked or leaning. With this done, the wing can be glued in. If the center of the stab was left flat, it can be glued into the fuselage at the same time, lining it up perfectly.

Then make the pushrod. I used $\frac{3}{32}$" wire with a Kwik-Link on the end by the stab. Install the fairleads, making sure that they don't foul on the pushrod, which would make it bind. With the fairleads installed, the controls should be almost free enough to work on leadout. If they are tight, work on the controls until they are free. Twenty flights can't be wasted waiting for the controls to work free.

Locate the engine, drilling for a two degree offset. Sand the front end to a two-degree angle. Cut out the nose ring from $\frac{1}{8}$" plywood, locate and epoxy it to the front block. When the epoxy hardens, cut out the top block and spot glue it to the body. Cut out the back half of the bottom block and spot glue it to the body. Cut out the front half of the bottom block, sand the airfoil out of it and spot glue it to the body. When all of this is dry, carve and sand to shape. Pop them off and hollow. The top block, when hollowed, should not exceed one oz.; the same applies for both of the bottom blocks together.

Bend the tail-wheel .075" wire and bind it to the $\frac{1}{8}$" plywood platform with $\frac{1}{2}$A flyline. Epoxy the entire structure. Cut out the doublers for the body sides and epoxy the doublers and the platform to the body. When hard, cut the clearance for the wire into the bottom block. With this done, all of the blocks can be glued in.

Now to begin construction of the cowl. Cut out the $\frac{3}{8}$" sides, $\frac{1}{4}$" spacer (on the face of the angled part), the $\frac{3}{4}$" block, and the front blocks. Line up all the blocks and epoxy them together. When the epoxy is hard, spot glue the cowl to the rest of the airplane. While this is drying, cut out the rudder and fin and glue these pieces together. Carving the cowl isn't as hard as it might look. Just use the cross-sections on page 37, September 1969 AAM. With this done, pop it off and hollow it out. Make the hold-down. Cut out the exhaust hole, the air outlet and air intake, and coat its interior with epoxy, making sure to work the epoxy into the wood to fuel-proof it. Carve the fin-rudder assembly and add it in place.

I used an eight-in. Midwest canopy because of the ridges that show where the back half of the bubble is separated from the windscreen. When painted, they add to the overall realism. Notch the canopy into the top block and add the cockpit detail. If a pilot is added, his size must be comparative to the plane's scale. Epoxy the canopy into the notch. Epoxy is the only adhesive that won't dissolve the canopy but will still hold it down. Cut out, carve, and glue on the flap fairings. Perfectionists may add elevator fairings.

Put on the fillets. I use Epoxolite putty because of its toughness and its resistance to cracking. It dries so hard that the fillets must be as close as possible to their final shape while they are still wet. To accomplish this, tape the outline of the fillet onto the airplane. Then smear the goop into the outline, shape with finger and water. Allow to dry for 20-30 minutes. At that time, peel off the tape and feather the edges, once again with finger and water. When satisfied with the shape, allow the fillets to harden overnight. Sand with coarse paper.

Covering the structure with light tissue is essential for obtaining a light, high-quality finish. Grain, pinholes, small knicks and other small surface imperfections are hidden. I use "Jap tissue" because it is light, fills quickly, and therefore suits the purpose nicely. My covering procedure is different, so it is given in detail.

After filling in the big dents and/or gouges, apply three unthinned coats of clear, sanding between each one. Now for my method. Place the dry tissue on the surface to be covered. Saturate the tissue with thinner. This softens the clear and causes the tissue to be virtually absorbed into the surface. Rubbing the tissue into the clear helps fill the tissue with clear from the bottom. When dry, fill with clear and talcum-clear. Use your favorite finishing method or, if in doubt, consult the articles on finishing by Dave Gierke or Don Bambrick.

The only other detail needing explanation is the wire used as an extension of the plug post. On the plans, it is shown just below the cowl. It is hooked onto the plug and trailed through the air outlet. I used this device to eliminate a large, unsightly hole in the bottom of the cowl. It worked well and I had no problems with starting the beast.

Wait for a relatively calm day to test fly. Except for a little nose weight and an extra quarter-oz. tip weight (I originally had a half ounce) I had no difficulty in trimming the Typhoon.

Cloud Nine

Continued from page 23

bulent conditions, and spun in for a 33-second flight in the fourth round. (The original Cloud 9 had been slightly damaged in the previous round.)

Later, Cloud 9 was flown at the Nats, Glenbrook, Ill., with only a few seconds under four straight maxes. The model was wound for the fifth and last flight, with about two and a half minutes needed to win. Launched directly into a boomer, it proceeded skyward with great haste; then there was a loud cracking sound! The rear motor anchor had come loose, allowing the still half-wound motor to snarl itself into a ball in the nose, causing the model to dive in for about seconds. There have been instances where some of the best fliers have beaten themselves under similar circumstances, but goofs like this can only overcome through much practice and conditioning — an important part of any FAI competitor's schedule.

Cloud 9 has more than satisfied all of primary objectives. Early morning still-air time averages three minutes plus and the climb is of a docile, forgiving nature, showing excellent stability in all conditions. The model has excellent penetrating qualities throughout the power burst, rolling into a steep, steady cruise all the way up. It has enjoyed a considerable amount of success in competition, having placed within the top three, including several firsts, in many West Coast meets in past years.

Construction

Wing: Because of the thin B-6405 section used, certain structural considerations, such as the shallow, wide spars, must be made. This spar arrangement was chosen because it allows the greatest resistance to rib distortion. Begin building the wing by laminating the entire leading edge. Soak the 1/16" strips in boiling water, pin place on the plan, using small balsa blocks against the wood, and allow to dry. When dry, cement the strips together using balsa cement or Titebond. While this is drying, shape and notch the trailing edge and pin in place. Be sure it is blocked up the required amount to insure proper airfoil contour each rib station. Cut out all ribs, using 1/16" plywood template, cutting only the bottom of each spar notch in its proper location. The various rib sizes are cut by merely rotating the template as illustrated.

After the ribs are all cemented in place (except diagonal, false ribs and dihedral ribs), the top spars are installed. The spruce spars for the inboard panels are formed and laminated in the same manner as the leading edge. The spar notches are completed by using the spars as guides and a sharp razor. Each spar must be the correct length to insure a good joint when the panels joined to the correct dihedral angle.

Next, cement in the diagonal ribs (except at dihedral joints) and the 1/16" sq. diagonals. After the panels are dry, join to the correct dihedral angle, joining the tips and center panels first, then the center joint. The bottom spar installed in the same the top, and all gussets cemented in place. The false ribs not cemented in place until the leading edge is shaped and sanded.

Stab: The stabilizer is built the manner as the wing except that there is no dihedral joint. I used 1/32" sq. spruce railroad stock for the diagonals, however, 1/16" sq. light balsa would do just as well. Careful wood selection is essential here, the stab weight should not exceed oz.

Fuselage: The diamond-type fuselage, nothing than box turned edgewise, was employed because of its simplicity. Yet it affords pleasing lines and a streamlined cross section. Spruce longerons used throughout for durability, because is this part of the model that takes of the abuse. The aft portion of the fuselage was built up primarily for weight reduction, but 1/16" sheet should work out fine for this portion in place of the 1/16 x 1/8" crosspieces, if light C-grain balsa is selected.

The sides constructed the conventional one on top of the other. Note on the plans that the 3/32" sheet sides are separated with pieces of 1/16" scrap balsa so that the outside surfaces are flush with the 1/8" longerons. The pylon is built up of 1/4" sheet balsa as noted on plan.

After assembly and prior to sanding make the lower portion slightly oversize, mark the centerline bottom using a ballpoint pen. To achieve the V-bevel needed to fit snugly the fuselage, hold sandpaper taut over the top of the fuselage. Align the mark with the top and carefully sand in the required bevel with a fore and aft motion.

After the front 1/16" plywood facing is cut out to the correct shape, cemented in place and allowed to dry, the nose section of the fuselage may shaped to the contour shown and faired into the plywood face. The tailpost is made from a piece of scrap balsa and beveled in the same manner as the wing. When installing the plywood stab rest, use scrap balsa corner filler blocks between the fuselage and stab rest on both sides for support. Shape these to a streamlined shape before cementing in place.

The 1/16" ply rear anchor reinforcements drilled first, then cemented their exact locations. When dry, cut the holes through the sides. I use a piece of 1/4" aluminum tubing with the end filed to a sharp edge, cutting with a rotary motion. The fin is built much the same manner as the wing and stab. The lifting section is used for right turn effect.

Prop: As previously mentioned, this type of front end assembly was chosen eliminate the inner portion of the prop blade. A little more initial effort is required, but it worthwhile for several reasons. The blade pitch angle adjustable (recommended for experimental only). Most important, if the blades are damaged, only new blades need be made, instead of the whole prop assembly.

To set the pitch, a jig consisting of a triangular template mounted a block and two plywood plates cemented the end of the block, with a notch in each one to accurately position the prop shaft square with the top surface of the block. These plates are spaced by an amount equal to the distance between the aluminum face plate and the rear of the bearing housing (about inch) and protrude out from the block one inch. The ends of the plates are slotted (using a 3/32" drill in a drill press and a razor saw), making sure they are aligned perpendicular to the top surface of the block.

When the prop assembly is mounted this gives positive shaft alignment between two points.

The only machining required is in making the aluminum hub and bearing housing. The rest of the parts can be made from aluminum plate, using a jeweler's saw and a file. The detachable aluminum T-bar coupling allows winding without prop breakage due to blown motors. After the motor is wound, a 1/16" or two mm wipe rod is inserted thru the hole to transfer the coupling to the shaft.

Select wood with a density of about 10-14 lbs. per cu. ft., straight-grained, with as few flaws as possible. I lay both blanks out on the same block, with tips facing the same direction and in line so that the ring pattern is the same through both blanks. This affords uniform blade flex, which is important during the initial power burst. The whole prop assembly should come out between 1 3/4 and 1 7/8 oz., but should not exceed 1 7/8 oz.

Covering and Flying: The entire framework is given two coats of dope thinned 50-50, sanded between each coat. Use silk and nylon reinforcement wherever specified; it is important for strength and durability. The model is covered with Japanese tissue and given three to four coats of dope thinned to 50-50. If nitrate is used, add about 8-12 drops of castor oil per oz. for plasticizing. After covering, epoxy the wire hooks to the stab, drill a 1/16" hole through the tail-post and epoxy a piece of 1/16" brass tubing in the hole as shown for the DT line.

Prior to making the first test flight, make sure all the flying surfaces are flat. Then, using a heat lamp, wash in the righthand wing panel about 1/16" at the inch. This provides cross control, which will help keep the right wing up during the high-power part of the climb. Balance the model at the correct point, with the motor installed. Incidence angles must be as shown on the plan. Also, shim the stab for the indicated correct tilt angle.

Begin test flying by making a couple of hand glides. If the glide is flat with a noticeable right turn, the model is ready to have a few winds put on the motor. First, shim the top of the nose block 1/16" for down thrust and the left side 3/32" for right thrust. This will give about two degrees down and three degrees right. Put about 50 winder turns on the motor and release the model gently, straight ahead into the wind. The model should then make a steady, gentle climb to the right. If the model turns too tightly, remove a little of the right thrust and try again, until a gentle right turn is attained.

Now for full power turns! Wind the motor to about 90% capacity (approximately winder turns for 16 strands of 1/4" Pirelli). Launch the model directly the wind at about a 45 degree angle and watch for any dangerous tendencies such as banking too much under high power or approaching a stall condition. If the former is the case, down and right thrust by small degrees until a steep, steady climb is achieved. It may be necessary to add a small amount of left tab for additional cross-control. If the model tends to stall, check the incidence setting and add down and right thrust to bring the nose down. When the model is properly adjusted, the thrust setting should be 1 degree down and 1 degree to 3 degrees right.

Pro-Line Competition Six

Continued from page 41

As indicated, the repetition rate is varied with pulse width. A free-running multivibrator sets the repetition rate and is followed by six half-shot multis for channel control. However, as the pulse width is increased for each channel, a slight adjustment is made in the period of the free-running multi. The rationale is that servo performance is improved by receiving its control information more frequently. If all channels are set for maximum pulse width, the apparent repetition rate becomes lower. (This can be heard on a monitor.) It is overcome by increasing the repetition rate. However, an external triggering on the oscilloscope is necessary for trouble shooting.

The receiver is enclosed in a 1/16" thick metal case covered with the same vinyl material as the transmitter. Dimensions are 1 3/4 x 7/8 x 2 13/16". Separate leads are brought out for power and each of the six servos. Three-pin, color-coded Deans connectors having gold-plated pins are used throughout. All seven of the power leads are twisted together, soldered and sleeved. The grommets at the end of the case provide strain relief. Only the single leads required for receiver power, the servo signal leads, and the antenna lead actually attach to the receiver board.

In size, the receiver is not miniaturized to the extent of most contemporary systems. The reason is that the circuitry is considerably more complex, with its primary purpose being to provide a significantly greater receiver sensitivity and resistance to electrical noise. The innovation most evident is the use of a fourth IF can. A double-tuned front end incorporates amplification between stages. This is followed by four stages of IF utilizing negative feedback for stability. The detected output is fed back to the RF amplifier in the front end and to each of the first three IF's to provide for fast AGC. The detected output is then fed to an elaborate four-stage squaring and noise rejection section prior to decoding. It is extremely effective, for the system is very solid in the face of almost any noise, nearby adjacent frequencies, etc.

The decoder is a long-used design based on the use of two transistors connected in the SCR type mode. The most unique feature of the receiver, to me, was its design for operation at a regulated voltage well below the nominal 4.8V supply. This permits safe operation down to 2.4V in the event of an emergency. The receiver gains and feedback are designed for this regulated voltage. The manufacturer claims 1.0 microvolts sensitivity at a full 4.8V supply, degrading only to 1.2 microvolts at 2.4V supply. Consider that, a few years back, 3.0 microvolts sensitivity was better than most. Sensitivity coupled with high transmitter output makes for really solid operations.

The system is available with either the PL-S-10 or PL-S-11 servo. These are the Kraft KPS-10 and KPS-11 servomechanisms with the Pro-Line bridge amplifier installed. The amplifier is a two-deck arrangement requiring no battery center tap, just 0V, + 4.8V and signal for a three-wire connection. This is not new; it has been used for years by KEK and, later, by F&M. However, the Pro-Line servo will operate satisfactorily down to a 2.4V supply level in the event of power supply problems while airborne. (Take my word for it!) For reference, the KPS-10 and KPS-11 servomechanisms were described in the Kraft system, August 1970.

A quick look at the battery pack of the disassembled airborne components will puzzle most people. Its unique arrangement is fully described in my column this month in "Where the Action Is." Briefly, each battery is by-passed by a low-forward-drop diode so that, if a cell fails, the system can continue to operate until a safe landing is made. This is made possible by the circuitry described earlier; 500 mah cells are used.

Bench Tests: The set first was put in the deep freeze to check at 0 F. degrees. Cold made no noticeable difference in performance, although the meter was a little hard to read because of the frost. Then off to the oven to check at 150 F. degrees. The manufacturer claims stability to 160 degrees F.; however, because of the plastic components and doubts about the accuracy of our oven, temperature was limited to 150 degree F. All was satisfactory, not a servo slowed or quit.

Servo thrust was found to be a full six lb. at the outermost hole in the disk output with a supply voltage of 5.1V. This was true in both directions of travel. (P-LS-11 servos were not tested; however, Pro-Line quotes 5.5 lb. for them).

In order to test the battery fail-safe arrangement, cell was deliberately disconnected to simulate a failure. The supply voltage under these conditions was 3.0V, i.e., 3.6V minus the 0.6V drop of the parallel diode. Servo output power was 2.7 lb. under these conditions and the range with transmitter antenna removed was in excess of 30 ft. The antenna-off range with full supply voltage was found to be 150 ft.

Servo current drain was relatively modest since full supply voltage is impressed and an 11-ohm motor is used. Unloaded, the servo draws about 60 ma. As load is increased to mid-range, drain increases to 150 to ma. At full stall load, drain was 400 ma. The manufacturer claims the servo amplifier will not be damaged even if stalled for long periods.

Flight Tests: The set was flight tested in an old R/C Nobler which was destroyed in an accident (see "Where the Action Is") be-

cause of a battery failure. This accident lead to the development of the battery fail-safe system discussed earlier. Tests were then continued in a new R/C Nobler with excellent results. The set is easy to handle, the sticks are smooth and controls are convenient. The PL-S-10 servo mechanics are fairly slow as used in other systems, but with the bridge amplifier used in the Pro-Line system, it is rather fast moving. The Nobler plane responds quickly and the fast servos were just right for doing sudden maneuvers such as half-snaps and the loop with the one-and-a-half snap.

After having built several R/C Noblers from scratch, it was a delight to assemble the Top Flite kit R/C Nobler. It faithfully follows the original design and goes together quite quickly. A departure from the kit's detailed instructions and booklet was to finish, cover, paint, and trim the wing and fuselage before permanently joining with epoxy. MonoKote was used on the wing and stab.

As shown in the instructions, the flaps were hooked to a trim bar with the fifth channel and with an additional servo. This system both provides normal coupled flap operation and permits lowering the flaps to 25 degrees for very slow steep landings. All up weight with a S.T. 46 and muffler was still well under six pounds.

Comments: The Pro-Line Competition Six appears to be an excellent system based on the tests and evaluation performed. The parts count for the receiver seems to be rather high, although I appreciate the level of performance it brings. No strong criticism of the system developed. Minor complaints are the rather inconvenient switch guard and the possible eventual galling of the pins of the plug connectors used.

The ability of the system to operate at reduced voltages must be praised. In combination with the fail-safe battery pack arrangement, it permits some of the battery problems in all systems to be overcome. The system is somewhat more expensive than similar ones, but this should be no barrier to the rabid competitor.

Mini Cat

Continued from page 51

preferable. The throttle torque rod also must be loose, since the pulse system doesn't have quite the torque of a propo system. No difficulties with the pulse servos were encountered at any speed range, and the Mini can move out. Both systems weighed about the same, and the Mini Cat came out at two lb., five oz.

Construction

The fuselage is simple, light, and strong, in contrast to many small RC models which, in order to save weight, are structurally fragile. The doublers on the Mini Cat are 1/32" ply. Contact cement was used since it is quick to set up and will not warp the balsa as the water soluble glues do. Attach the nose gear before installing the firewall with epoxy. The Mini Cat steers surprisingly well with a fixed nose gear. The nose wheel and gear are offset 3/16 in. to the right on the firewall. This will counteract the left torque on takeoff.

The wing construction is standard. In place of the 1/16" sheet ribs usual on a model of this size, 3/32" sheet ribs were used. Cap strips are eliminated. The Mini Cat wing is covered with MonoKote and weighs only five and one half oz. Be sure to use selected hard spars for a true strong wing. The aileron may be installed now or later. The tail assembly is simple and easy to construct. Take care in selecting the wood and in aligning fin and rudder.

Flying the Mini Cat is sheer joy! No problem areas have been found. It is fast and responsive with the Webra 20, but the glide and landing approach are slow and easy — much different from many smaller birds, which seem to fall out of the air when power is pulled back. The Mini Cat uses the same airfoil as the Aristo-Cat, and this accounts for its ease of handling.

For a really fun bird which is easily assembled in a week, almost all out of the scraps box, try the Mini Cat. You will have a ball with it — as I have had.

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